This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B 434799

PRESENTED BY
THE SOCIETY

T.077
T-7
UNIV. OF MICHIGAN
JUL 12 1913
1134t

TRANSACTIONS

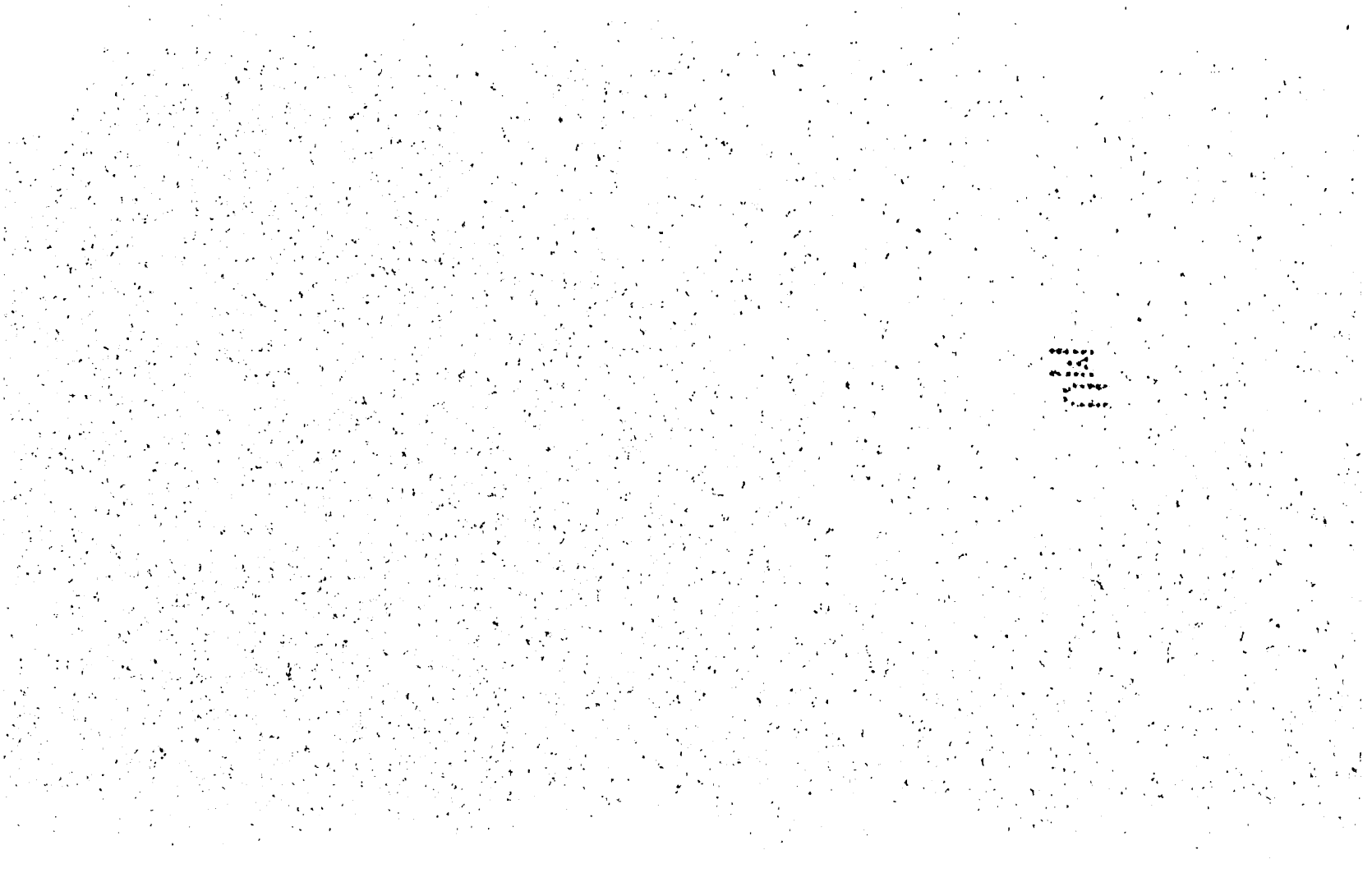
OF THE

MASSACHUSETTS HORTICULTURAL SOCIETY

FOR THE YEAR 1913

PART I

PUBLISHED BY THE SOCIETY
BOSTON
NINETEEN HUNDRED AND THIRTEEN



TRANSACTIONS

OF THE

Massachusetts Horticultural Society

FOR THE YEAR 1913

PART I

BOSTON
PRINTED FOR THE SOCIETY
NINETEEN HUNDRED AND THIRTEEN

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1913.

President.

JOHN K. M. L. FARQUHAR, of Boston.

Vice-Presidents.

WALTER HUNNEWELL, of Boston.
RICHARD M. SALTONSTALL, of Chestnut Hill.

Treasurer.

WALTER HUNNEWELL, of Boston

Secretary.

WILLIAM P. RICH, of Chelsea.*

Trustees.

THOMAS ALLEN, of Boston.
F. LOTHROP AMES, of North Easton.
ERNEST B. DANE, of Brookline.
WILLIAM DOWNS, of Chestnut Hill.
ARTHUR F. ESTABROOK, of Boston.
NATHANIEL T. KIDDER, of Milton.
CHARLES W. PARKER, of Boston.
THOMAS ROLAND, of Nahant.
CHARLES S. SARGENT, of Brookline.
STEPHEN M. WELD, of Wareham.
WILFRID WHEELER, of Concord.
EDWARD B. WILDER, of Dorchester.

Nominating Committee.

HAROLD L. FROST, of Arlington.
T. D. HATFIELD, of Wellesley.
HENRY S. HUNNEWELL, of Boston.
HERBERT W. RAWSON, of Arlington.
WILLIAM SIM, of Cliftondale.

* Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

COMMITTEES FOR 1913.

Finance Committee.

WALTER HUNNEWELL, *Chairman.*
ARTHUR F. ESTABROOK, STEPHEN M. WELD.

Committee on Prizes and Exhibitions.

JAMES WHEELER, *Chairman.*
DUNCAN FINLAYSON, S. J. GODDARD, T. D. HATFIELD,
DR. W. G. KENDALL, ALEXANDER MONTGOMERY,
EDWARD B. WILDER.

Committee on Plants and Flowers.

T. D. HATFIELD, *Chairman.*
ARTHUR H. FEWKES, DONALD McKENZIE,
JAMES MARLBOROUGH, WILLIAM NICHOLSON,
WILLIAM SIM.

Committee on Fruits.

EDWARD B. WILDER, *Chairman.*
WILLIAM DOWNS, HAROLD L. FROST.

Committee on Vegetables.

DUNCAN FINLAYSON, *Chairman.*
WILLIAM N. CRAIG, HENRY M. HOWARD.

Committee on Gardens.

JOHN K. M. L. FARQUHAR, *Chairman.*
DAVID R. CRAIG, JACKSON T. DAWSON, ARTHUR H. FEWKES,
THOMAS J. GREY, T. D. HATFIELD, RICHARD HITTINGER,
DR. HARRIS KENNEDY, WILLIAM NICHOLSON,
DAVID F. ROY, CHARLES SANDER, WILFRID WHEELER.

Committee on Library.

CHARLES S. SARGENT, *Chairman.*
ERNEST B. DANE, GEORGE B. DORR, CHARLES S. MINOT.

Committee on Lectures and Publications.

WILFRID WHEELER, *Chairman.*
GEORGE B. DORR, F. C. SEARS.

Committee on Children's Gardens.

HENRY S. ADAMS, *Chairman.*
MISS MARGARET A. RAND, HARRY S. RAND, WM. P. RICH,
B. HAMMOND TRACY, JAMES WHEELER.

300777

MASSACHUSETTS HORTICULTURAL SOCIETY.

1913.

The Transactions of the Society are issued annually in two parts under the direction of the Committee on Lectures and Publications.

Communications relating to the objects of the Society, its publications, exhibitions, and membership, may be addressed to William P. Rich, Secretary, Horticultural Hall, No. 300 Massachusetts Avenue, Boston, Massachusetts.

WILFRID WHEELER, *Chairman*
GEORGE B. DORR
F. C. SEARS
} *Committee on Lectures and Publications.*

CONTENTS.

THE INAUGURAL MEETING 7

HORTICULTURAL PAPERS AND DISCUSSIONS

The Problems of the Commercial Fruit Grower. By *G. A. Drew* 13

Planting Fruit Trees from Strains of Known Worth. By *Samuel Fraser* 23

Factors Influencing the Formation of Fruit Buds in Apple Trees. By *Prof. B. S. Pickett* . . . 57

Adaptation of Local Grown Seed to Local Conditions. By *Dr. Will W. Tracy* 73

Landscape Arrangement of Public Parks and Private Grounds. By *Arthur A. Shurtleff* . . . 81

The Diseases of the Violet. By *Dr. Donald Reddick* . 85

The Gladiolus and its Culture. By *B. Hammond Tracy* 103

Fertilizer Problems of the Orchard and Garden. By *Prof. G. E. Adams* 109

The Making of a Country Estate. By *Henry Wild* . 119

THE INAUGURAL MEETING, JANUARY 11, 1913.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

1913, PART I.

INAUGURAL MEETING.

The Inaugural Meeting of the Massachusetts Horticultural Society for the year 1913, was held at Horticultural Hall, Boston, on Saturday, January 11, at eleven o'clock.

The retiring President, Charles W. Parker, occupied the chair and the Secretary read the call for the meeting and the record of the last meeting of the Society which was duly approved.

The President-elect, John K. M. L. Farquhar, was then introduced and delivered the following inaugural address:

Inaugural Address of President Farquhar.

Ladies and Gentlemen: —

You have on many occasions listened to addresses extolling the work and standing of the Society in the field of horticulture, and these pleasant platitudes undoubtedly have been justified.

Today conditions are in many respects different from what have obtained heretofore, and were I to attempt to beguile you with a review of our past achievements to an attitude of satisfied composure, I should be delinquent in my fulfilment of the high office to which you have called me.

We may no longer rest upon our laurels. During the past decade other sections of the country and other organizations have

in numerous instances made greater proportionate progress than we have done, and today our vantage ground is less assured than it has been for three-quarters of a century. I believe that we are still well in the lead, but to hold our prestige will require greater energy and more advanced effort on our part than we have exercised in recent years.

We rejoice to see interest in the art and practice of horticulture spread over our country; to promote that interest has been the reason of our existence, and much of it is due to our efforts.

In recent years the automobile has been indirectly amongst the foremost factors in the promotion of horticulture. It has enlarged the zone of suburban residences and has made possible larger and more beautiful homes. It has made life in the country much more enjoyable, overcome its former isolation, and led to the present taste for well-appointed houses and gardens, with lawns, trees, shrubs, flowers, fruits, and vegetables. Interest in the game of golf and other rural pastimes has been a potent factor in lawn improvement.

The acquisition of many hundreds of new plants from China by the Arnold Arboretum has not only afforded a large supply of new material for outdoor gardening, but will greatly stimulate interest in hardy plants and also provide new fields for the work of the hybridizer.

Our recent exhibitions suggest the thought that possibly those engaged in commercial floriculture in Massachusetts have been more progressive of late than some of our amateurs. We have numerous zealous amateur exhibitors, but their number should be largely augmented from among the many owners of beautiful estates in this vicinity.

There is a field of work for the Society in extending horticultural education more generally to the amateur classes. While we should encourage the attainment of higher horticultural knowledge among our younger gardeners and others engaged in horticultural pursuits, we might well aid our school teachers in their noble work of children's gardening by opening classes, where they might get better and more practical knowledge to impart.

We have been proud of our library as being the most extensive and comprehensive horticultural library in the world. Let me say

here, that the Royal Horticultural Society of London has just set aside five thousand pounds sterling ($25,000) to give to its Lindley Library the first place.

From the early days of this Society it has maintained mutual relationship with other organizations, whose purpose was akin to ours. We now have an increasing number of sister organizations engaged in the promotion of various branches of horticulture, some national in scope, others devoted to sectional work. Although we have been ready always to extend courtesies to several of these, it might be well for us to consider whether we are as closely allied to the foremost of them as we should be.

I have purposely refrained from touching upon phases of the Society's work which may be safely left with its efficient committees. The purpose of my remarks is to awaken my fellow members to the opportunities before us. If I succeed in this I shall be satisfied.

Let us not loiter, but let our zeal be as perennial as the plants of our gardens, that renew their life vigor with the first warmth of each recurring spring.

At the conclusion of his address the President called for the usual annual reports of the officers and chairmen of committees which were presented as follow:

Report of the Board of Trustees, by the Secretary.

Report of the Treasurer, Walter Hunnewell.

Report of the Secretary and Librarian.

Report of the Delegate to the State Board of Agriculture, Wilfrid Wheeler.

Report of the Committee on Prizes and Exhibitions, J. K. M. L. Farquhar, Chairman.

Report of the Committee on Plants and Flowers, T. D. Hatfield, Chairman.

Report of the Committee on Fruits, Edward B. Wilder, Chairman.

Report of the Committee on Vegetables, Duncan Finlayson, Chairman.

Report of the Committee on Gardens, C. W. Parker, Chairman.

Report of the Committee on Children's Gardens, H. S. Adams, Chairman.

Report of the Committee on Lectures, E. B. Wilder, Chairman.

The reports were severally accepted and referred to the Committee on Lectures and Publications.

On motion of William J. Stewart it was voted that there be entered upon the records of the Society an expression of appreciation of the zeal and ability with which the retiring President has filled the position during the past two years.

It was voted also, on motion of Mr. Kidder, to recommend to the Board of Trustees that a committee be appointed to procure the portraits of the three recent Presidents of the Society.

Edward W. Breed, the President of the Worcester County Horticultural Society, was called upon and responded with a brief address. Mr. Breed stated that he had always had an interest in the Massachusetts Society for his grandfather was one of its founders.

The meeting was then dissolved.

WILLIAM P. RICH,
Secretary.

HORTICULTURAL PAPERS AND DISCUSSIONS.

PROBLEMS OF THE COMMERCIAL FRUIT GROWER.

By G. A. Drew, Greenwich, Conn.

Delivered before the Society, January 4, 1913.

I am very glad to have the opportunity to speak to you today on commercial fruit growing; not that I can throw any new light on the subject, perhaps, or offer any suggestions of particular value, but because I am glad of the honor of speaking to you on a subject that has interested me intensely since boyhood, and to which I have devoted practically all my life.

While I have studied, observed, and travelled much of the country over, to inform myself in this line, I am coming to realize more and more that however much knowledge he has, and notwithstanding the progress he has made, the problems which confront the commercial fruit grower are greater today than ever before.

Today, conditions are such that world-wide interest is being taken in agricultural pursuits. Whatever else happens, the people must be fed. We can economize, if necessary, on nearly everything else, but not on food. Fruit is no longer considered a luxury, but a necessary part of the diet in nearly all intelligent families.

In this great revival of agricultural interest, New England has at last come to a realization of her wonderful commercial fruit-growing possibilities, so long neglected. She has begun to appreciate her strategic position, near the best markets, and where wealth is concentrated to a great extent. .Our agricultural colleges, experiment stations, and agricultural writers have done much to encourage and aid in this development, but to my mind, the greatest encouragement has been given by those who have had faith to back up their belief in New England's advantages by

developing fruit propositions of their own. In my opinion, one successful private enterprise of this nature will accomplish more, as an object lesson, than any number of demonstration farms backed by public aid. As one who has always believed in the possibilities of New England fruit growing, and who has backed up this conviction to the extent of his pocketbook, I will speak from personal experience of the problems which have confronted me.

Location.

Fortunate indeed is he who has his location already selected or has definite plans formed. A location which would suit one individual might be entirely unfitted to another. He must take into consideration the original cost of the land, whether cleared or in the rough. Probably most people would be willing to pay considerably more for a cleared section of land than undertake clearing themselves. Unfortunately — or fortunately — as the case may be, there is comparatively little cleared fruit land of any considerable area available in New England. Clearing land is a slow, costly, and arduous task, but to many is extremely interesting as well, and to one who can afford the necessary capital there is no question but, in the long run, the expense is justified. I have known parties to spend from $50 to $250 per acre in clearing land and feel well repaid for their efforts.

Elevation and air drainage are important factors to take into consideration. With all fruits it is desirable, and for some, like peaches and grapes, it is absolutely essential. In case of peaches in southern Massachusetts or northern Connecticut an elevation of from 500 to 700 feet should be selected if possible. For apples, though not quite so important, an elevation much over 1000 ft. would not be desirable.

Soil conditions must of course be taken into consideration. One that will hold moisture and still not requiring artificial drainage is very desirable. Light, sandy soils, while easy to work, do not hold the available plant food and often suffer from droughts.

Transportation facilities of course should be studied in respect to good natural roads for teams or auto trucks, direct railroad connection with important centers, and electric car lines for trolley

express and transporting labor. Again, in growing perishable products, as raspberries, peaches, plums, or cherries, accessibility to a large center is much more essential than when growing staple products, like winter apples, which can be shipped from a distance. Ideal locations are hard to find, and one seldom obtains all the desirable features in any one place. Probably a great many persons' experience coincides with mine in spending much time and money looking for the ideal location and finally settling down at home.

Fruits to Grow.

A great advantage of New England is that with proper locations selected, almost any fruits native to the temperate zone can be well grown, as apples, peaches, pears, plums, grapes, quinces, cherries, raspberries, blackberries, and currants, provided that the right varieties of these fruits are properly selected. For commercial growers one or two fruits is the safest course.

Varieties to select.

It holds true with the varieties as with the fruits to grow that for commercial growers the selection should be narrowed down to a few standard varieties, or in case one wishes to cover the entire season, with only one special kind at a particular time. With peaches in particular, commercial growers plan to cover the entire season from earliest to latest with varieties that mature in that particular season. A list of the standard varieties of fruits that one could select would be so extended and is so much a matter of individual choice that I can mention only a few which cover the widest range and are most generally successful.

Apples. Red Astrachan, Williams' Favorite, Duchess, Wealthy, Gravenstein, McIntosh, Baldwin, Rhode Island Greening, and Northern Spy.

Peaches. Greensboro, Carman, Heiley, Champion, Elberta, Stump, Late Crawford, and Fox Seedling.

Pears. Clapp's Favorite, Bartlett, Seckel, Sheldon, Bosc, and Anjou.

Problems of Nursery Stock.

It is often a problem for the commercial grower where he shall buy his nursery stock; in fact, so many disappointments have been met with in this line that many have attempted to grow their own to be sure of obtaining the variety they desire. While this is perfectly feasible and has many advantages for one who has the necessary special knowledge to attempt this work, for the average commercial fruit grower it is out of the question. The problem therefore is to select a firm of known reputation which gives personal attention and will guarantee their stock true to names. There are honest and reliable nursery firms, just as there are honest and reliable commission men and horse dealers, but you have to hunt them out.

Methods of Planting.

Most commercial orchardists now practice the filler method system rather than planting standard trees the ultimate distance apart they will require. To utilize the ground to the best advantage many different combinations are worked, and as long as the filler produces and does not check the ultimate development of the standard tree the plan is to be commended. While some successful growers interplant peaches, plums, and cherries between apples, claiming to bring the standard tree to bearing age without additional cost, it requires extremely careful handling not to produce lasting harmful results.

It is a much safer plan, for the average commercial grower, to interplant apples with apples, peaches with peaches, and pears with pears. With apples, a long-lived variety can be planted with a short-lived variety, i. e., Baldwin and Duchess, or with peaches a variety of known worth like Elberta with a newer variety, such as Mayflower, leaving the selection of the standard tree till they come to bearing age. The tendency of late years has been for too close planting, as standard apple trees should ultimately have from 40 to 45 feet, peaches 20 to 22, and pears 25 to 30.

Problems of Culture.

While some still question the advisability of growing fruit trees rapidly until bearing age, the general trend at the present time is to bring the orchard to maturity in the least possible time, and when the idea is not carried to extremes, it is most certainly to be recommended. Thorough culture, particularly with a system of cover crops, while trees are young, is much safer for the average orchardist than any modification of the sod mulch system.

Maintaining Soil Fertility.

The question of maintaining soil fertility in an orchard is somewhat different than with other crops where rotation systems can be practised. An orchard planted and well cared for is a long time proposition, therefore the soil should be in good heart when the trees are set.

Most of our New England soils need potash, phosphoric acid, and lime in abundance, and these should be supplied from the cheapest available sources consistent with the crop requirements.

Our soils must have humus and this must be supplied either by animal manure or by ploughing under vegetable matter, like clover vetch, or even weeds. While the trees are still young is the time to store the soil full of this humus at the least cost. When the trees reach maturity and are bearing heavy crops of fruit it is generally difficult to get a sufficient growth to supply much humus.

Spraying.

A few years ago, Bordeaux mixture was practically discarded in favor of lime and sulphur. Today we are not so sure that the fungous diseases can be so well controlled in all cases by the latter. Shall we make our own spray mixtures or buy those already prepared? There are numerous points in favor of each method. It is simply a matter of arithmetic, and each man must decide from his own particular standpoint. So many insect enemies and fungous diseases are constantly arising that advice on this point which might be of value today would be out of date tomorrow.

Thinning Fruit.

To save the vitality of the tree, obtain the necessary size and a large per cent of extra fancy fruit, it is important that fruiting trees have a certain proportion of their fruit removed in the early stages. This is a practice invariably in use on the Pacific Coast, and which too few of our Eastern growers have adopted. The cost is slight in proportion to the benefits obtained.

Harvesting Problems.

To obtain the highest colored fruit, apples, in particular, and other fruits, in general, should be picked over several times, the immature fruit being left on the tree for further development. The fruit should be picked carefully, placed in shallow boxes, and put in cold storage at once to be packed as the market demands. In case cold storage facilities are not available, natural cellars are no mean substitutes.

Grading and Packing.

We are at a disadvantage with our Western competitors in that the standard of grading among different growers is not down to a more definite, guaranteed basis. Where one Eastern orchardist packs and grades his fruit in the most approved manner, a dozen adopt the opposite course.

Shall we pack our fruit in barrels or in boxes? The tendency seems to be the latter for extra fancy fruit, and in my opinion it is bound in time to prevail. The barrel helps the wholesaler and the retail distributor as well, as it enables him to sell by the quart where he should be selling by the package. Even the box, I think, is too large a package in many cases, for we need to study to reach the ultimate consumer without passing through too many hands.

Another point the progressive Eastern grower is gradually learning, is that it pays to label his packages and guarantee the contents, on the principle that once a customer, always a customer.

Problems of Consumption.

While I believe that there is a greater opportunity in commercial fruit growing in New England today for the practical grower and careful investor than ever before, I cannot help feeling that many unwise ventures are being made. Fruit growing, like any other business or profession, is a life study and cannot be mastered in a day. But many people, often clerks, ministers, or retired business men, encouraged by false stories of great profits and the wonderful future in fruit growing, have plunged headlong into the undertaking without any special knowledge or preparation. Some of these, finding that commercial orcharding is no get-rich-quick proposition, that time, money, and patience are required before an orchard comes to maturity, abandon their projects very soon. They were, in fact, doomed to failure from the start. I believe in a healthy growth of the fruit growing industry, but not in encouraging so many totally unfitted people to try it. Only those who love the business and know it and who will persevere can succeed.

When we stop to consider the tremendous areas being planted with fruit trees in the Northwest, Colorado, Virginia and West Virginia, Maryland, Michigan, New York, and our own New England, we may well pause to consider whether Mr. Hale's word of caution on "going slow" is not a timely one. Even if only a small proportion of the trees set out ever come into profitable bearing, or if insect enemies and fungous diseases should raise havoc heretofore unheard of, there will still be millions of trees producing fruit every year.

This ever increasing number of bearing trees will make the problem of distribution and consumption the greatest one confronting the grower. Not only must we reach out for markets yet undeveloped but we must conduct a campaign of education to increase consumption. This cannot be done by individual effort, but must be the result of coöperation on a broad scale. Here we may learn a lesson from the Western growers, who have perfected the coöperative plan in many branches.

With this enormous production of fruit and consequent low prices, our problem should be how to reach the ultimate consumer so that he may receive the benefit. The competition will be close,

but as I have tried to show you, New England has more natural advantages than her competitors in other sections of the country. While I have spoken a word of caution against ill-advised and indiscriminate planting, I am optimistic that all the problems which confront the commercial fruit grower will be met and solved.

Discussion.

The suggestion was offered that there was no fear of the price of apples being too low when the consumer pays five cents apiece on the street here.

The Lecturer stated that this was one of the greatest problems in fruit growing — how to reach the ultimate consumer so that the grower will get the benefit. Something must be wrong when such a condition exists and it opens up a great field for the individual grower to study.

He said there was no reason why our fruit growers should not reach the ultimate consumer directly and eliminate the numerous steps from grower to commission man; from commission man to retailer; and from retailer to consumer. He advocated packing in small packages, in boxes, bushel or half-bushel hampers, and pasteboard cartons.

The question was asked how to avoid paying $45.00 per ton for fertilizer.

The Lecturer replied "Make your own. Do not use commercial fertilizers. Buy your basic slag and potash. Use these and a little bone meal. $25 to $30 a ton is what it costs me for what I consider a very good fertilizer. Use raw chemicals. I don't use mixed goods."

Another question asked was what was the lecturer's experience in using oil for spraying trees, and if any injury resulted from its use.

Mr. Drew replied that his method was to spray with oil in the fall for scale, and lime and sulphur in the spring. He had found this treatment good for scale and fungus and had never had any trees injured. A first-class oil is perfectly safe but it should not be applied when the bark is wet.

The question was asked how large an orchard it would be neces-

sary to have for an investment, and what would be the average net return, and how long it would be before any income could be expected.

Mr. Drew answered that in the West orchard land was divided into 10 or 20 acre tracts. In New England 50 acres was about as much as one individual could properly handle; 100 acres is a big proposition. The land would cost, say, $100 per acre, and it would be 10 years (if it had been well handled) planted with apples, 4 or 5 years with peaches, 3 or 4 years with small fruits, and 8 or 10 years with pears, before returns could be expected. He would say that $50 per acre after 10 years was a fair average return.

The question was asked what were the ideal conditions for the successful growing of the McIntosh apple.

The Lecturer replied that the McIntosh was now being planted in every variety of soil, which was unfortunate, and unfavorable conditions abound. It should have reasonable elevation, about 300 feet, good drainage, rather gravelly soil, although it will grow in clayey soil, and should be sprayed with a copper base spray. It is a northern apple and needs a cold temperature and that of Massachusetts is good for it.

Another question was as to the desirability of putting strawberries, raspberries, and blackberries in a young orchard.

Mr. Drew said that this was frequently done, but it should be remembered that you are raising two crops and must feed two crops. He advised caution in this matter and that the small fruits should be removed just as soon as necessary, and especially not to delay the removal too long.

In reply to a question as to the best preventive for the peach borer Mr. Drew said that he knew of none.

Another question was Can nitrogen be entirely supplied by leguminous crops without chemical fertilizers?

Mr. Drew said that if the soil was in good condition or as is termed in good heart it was entirely possible and feasible. He advised adding considerable lime and some potash, in connection with basic slag, and there would be no question that the leguminous crops could be depended upon to supply all the nitrogen necessary.

PLANTING FRUIT TREES FROM STRAINS OF KNOWN WORTH.

By Samuel Fraser, Geneseo, N. Y.

Delivered before the Society, January 11, 1913.

In speaking to this heading I am aware of the fact that I am on dangerous ground. The problems connected with the propagation of trees are feebly understood and the selection of individuals for the purpose of reproduction is on no statistical basis. In other words, we have very little data either for or against any such policy, but it seems to me it is necessary that we begin at least to inquire as to the merits of the situation, whether there is any possibility for improvement along this line, or whether it is merely the theory of a few imaginative minds. The idea has been discussed for several years. We find it in horticultural literature as far back as thirty years ago, that there was something in the selection of buds or grafts from individual trees which were producing large yields or were favorable in other respects. Before I go further I would like to make myself clear so that I can get out of the hole, if I need to, should I be found to be in it. I claim, therefore, that in anything I say, I be accorded the same privilege as the railroad time table, subject to change without notice. In other words, our information is at present feeble and weak, but we are looking for more and expect to find it and should we later find it necessary to modify our views we shall do so in accord with the increased weight of evidence.

Our methods with fruit, at the present time, are much the same as those of the farmers in regard to such plants as timothy, clover, and various grasses which are used in our pastures and meadows.

One goes to the seed store and purchases timothy. What is in those timothy seeds? The inherent power, the vigor, productivity, the power of germination, and all the various things which go to make up a plant, are unknown. The percentage germination may be readily determined; the capacity of the individual seed to make a productive plant cannot be measured; there is no Babcock test for this particular feature, in fact, there has been very little attention paid to the necessity for such, and no doubt when there is a sufficient demand, there will be a means supplied for measuring these different values. Thus far, however, there has been little evidence that these differences occurred, and no commercial recognition thereof.

In 1903 the Cornell Station began a series of experiments with timothy to determine the differences which existed. In the first patch some 12,000 plants were put out in rows 3 feet apart, from 22 different sources of seed; these were properly checked by having a relatively uniform sample of seed sown at intervals. The variations which occurred in this block of plants were extremely interesting. A large number of the individuals did not show sufficient ability to live more than one season. They may have been annuals or they may have been plants which could not endure the adverse circumstances which came in their way on the heavy loam soils upon which they were planted, although as a grass soil no one type is perhaps better than the Dunkirk clay loam upon which the experiment was conducted. To make a long story short, there were all kinds of differences; some plants would yield 1 pound, others would not produce one-hundredth of 1 pound of hay; they were all given uniform conditions so far as the amount of room was concerned; they were all supplied adequately with moisture and plant food. Marked differences were found between individual plants; one having small narrow leaves, another large broad leaves; one might be tall and its neighbor short; these were not due to soil conditions; they were not due to climatic conditions; they were simply due to inherent power and vigor in the plants themselves, and yet, with this fact demonstrated to a man he would go into a nursery to buy Baldwin trees and assume that each individual tree was of equal vigor provided it was of equal size at the time. We have no proof that the one which is vigorous

is necessarily a more productive or more valuable tree than the one of slightly less caliper; in other words, there is no proof that the tree which is $\frac{3}{4}''$ in diameter will be a more productive tree and a better money-maker than the one which is $\frac{5}{8}''$, and yet, in the nursery we are invariably able to secure more money from the tree which is $\frac{3}{4}''$ in caliper than from the one which is $\frac{1}{2}''$ or $\frac{5}{8}''$, in fact, the $\frac{1}{2}''$ tree is not worth more than half as much as the $\frac{3}{4}''$ tree.

Is this based upon rational judgment? Does the man who purchases know that he is securing greater value from the $\frac{3}{4}''$ than the $\frac{1}{2}''$, or is it merely the idea that we like to get something which fills the eye, and so long as the man can get a large amount of wood for his money he feels satisfied? There is a great deal in this, for if we go into the apple market we shall find that about 90 per cent of the sales are made upon the pleasing effect upon the eye. Only some 10 per cent of weight is given to quality, although there is beginning to be in certain markets a tendency to discriminate in favor of quality, but at the present moment 90 per cent of the sales are made upon the effect upon the eyesight and the same is as true in nursery stock as in apple selling; it is just as true in the selling of many other products. Is it wise? Is it the right basis? This is the question to decide. If not, we should have some better method of value. What is an adequate measure of value in the case of an apple tree?

In the case of our horses or cattle we have used performance. We measure the value of our Holstein cattle by their value for the production of milk. We measure the value of our trotting horses by their ability to pull off a speed test in a given amount of time. Are we going to measure our apple trees by their ability to produce apples or not? Or is the idea of any such difference occurring in apple trees merely the fancy of a disordered mind? We occasionally hear some enthusiast claim that a Baldwin is a Baldwin; that there are no differences; that the present day R. I. Greening is no different from the Greening which originally stood in New England. Whether this is so or not I would like to question. If it is true the individual will not be hurt neither will the trees be hurt in any way and we shall know definitely whether to search further in this problem. It is to my mind then necessary to determine first whether there is a difference in apple trees, or whether they are unlike any other tree with which we are dealing.

If we look at the lemon, orange, or grapefruit we now find that the growers of these fruits have recognized marked differences in yield and other characters in certain varieties of these trees, not differences in varieties for those are readily recognized and are conceded to be of very great import. No man would undertake to plant Newtown Pippin here and expect to grow as good an apple as he might in the Virginias; no man would undertake to grow Shockley or Yates in New England; they belong in the Southern limit of apple production, yet these differences are so striking that they are accepted on their face; we are used to them. Are there not differences just as striking among the individual trees in our orchards which we have not accepted for the simple reason that they have not been impressed upon us?

We have a little statistical data which has been collected through the energy of Mr. Shamel in California in connection with oranges, lemons, and grapefruit. Permit me to direct your attention to this report which is found in the Proceedings of the Forty-first California State Fruit Growers' Convention, August, 1912. The work has now been in progress for three years and some rather astonishing and striking facts have been disclosed in regard to the variation among citrus fruits and especially in regard to the characters of bud variation. It may be stated here by the opponents to the theory of differences that bud variation should promptly be excluded. To my mind a bud variation is something which stands out as apparent to the eye at once without any statistical measurement. I do not see, however, to what degree one can accept this and yet bar out any factor which might have to do with yield, which variation could not be determined save by statistical records. Why not ability to produce a large amount of fruit just as important a bud variation as ability to produce no fruit or ability to produce a leaf which is smooth along the edges or one which is serrated, or ability to produce a white-splashed leaf compared with one which is totally green, or the ability to produce foliage like Weir's Cut-leaf maple in comparison with the ordinary maple.

We have accepted these differences because they appeal to the eye, but there are plenty of differences which cannot be determined except by some statistical basis of measurement and they are frequently of more economic value than those which are so readily

accepted. Of all purposes for which fruit trees are grown there is none which is of more importance than that of ability to produce fruit. In other words, we do not, in my judgment, grow an apple tree in order that it may be a nice looking tree, in order that it may have good shape, or in order that it may be pleasing to us when we look at it. We grow an apple tree for the production of apples which can be used as human food. We may for a time be able to produce apples which are exquisite in appearance, which are valuable for table decoration only, but I affirm that such a business will inevitably be overdone and that the prime object and the one upon which the business is based is that of producing apples for human consumption, and those who undertake to go into the fancy grade alone, for the production of apples merely for showing, will frequently find their business is quickly overdone; there is some room for this, but in my mind, a commercial apple orchard is planted solely for the production of apples for human consumption, and the great body of the consumers are the workers who can pay only a certain price and above that price apples become a luxury and not an article of food and the demand is curtailed. Therefore, I contend that we need trees which will produce the maximum of first-class merchantable fruit in the minimum time and at a minimum cost; and if we find that yield is an hereditary factor, it will become a very important matter to the future planter of commercial orchards.

To return to our citrus fruits we find then that the number of bud variations is considerable. Take the Eureka ranch in which the Washington Navel orange is grown exclusively, or almost exclusively, and where considerable of the work was done on a block of 150 acres, generally considered to be the most uniform grove of its kind in the State of California, the fruit from which commands an extra price in Eastern markets on account of its fine character and its consistent uniformity, a grove in which to the casual observer the trees and fruit are notable for their uniformity in appearance. A close study of the trees in this grove has revealed the fact that there are at least seven frequently occurring types of the Washington Navel orange. Five of the types are unproductive; they bear low-grade fruit which is undesirable and unprofitable. Out of about 13,500 trees over 1,000 trees have

been located as absolutely undesirable. In fact, at the end of three years the National Orange Co. regarded these so undesirable that they have rebudded them, using buds from selected trees of the standard type of the Washington Navel orange. These rebudded trees do not represent all of the undesirable type trees present in this grove, from the fact that only the most striking and certain cases of undesirable types of trees were rebudded. Dr. Shamel states that in these cases they felt absolutely sure that there could not possibly be any mistake. The striking feature of this condition lies in the fact that the trees in this grove were propagated from buds, but shortly removed from the two parent Navel trees in Riverside. This, of course, is the most interesting statement because it appears to throw doubt upon the whole value of bud selection and bud propagation. If such a remarkable difference should occur in so short a space of time, one may question whether there is something more underlying propagation than we have been in the habit of assuming; in other words, it will naturally bring up the question as to whether there may not be not only bud variation in the tree itself, but whether the relative position of some of the buds on the bud stick may have some importance which we have not given them credit for. Hedrick of Geneva has suggested that there may be, and certainly is, a necessity for investigation along this line of the relative importance of position of buds. I know of no data thereon. From other data which is contained in this report of Dr. Shamel's we are led to assume that the Navel orange is in a particularly variable mood; in other words, the frequency of variance is remarkable and nothing has revealed the variation so much as statistical measurements of the yield secured. The grading and counting and weighing of the fruit from each tree has revealed the presence of enormous variation apart from those which were readily seen by the eye, and one interesting thing is the frequency of off-type branches in a given tree; in other words, the bud mutation is quite frequent and easily recognized by one who goes through the grove carefully.

In the Dixon grove, planted to Marsh's seedless grapefruit, where part of this work was carried out, out of a total of 500 trees it was found that 123 were unproductive, some of them bearing fruits with as many as 96 seeds each; many of the off-type trees

produced extremely large, coarse skinned, juiceless and flavorless fruits, or some were otherwise undesirable or unsalable. In addition to these off-types they had found a type of the standard Marsh's seedless tree that bears a full crop only every alternate season, being practically barren in other seasons. In some of the standard type trees there was fruit borne which sold as high as $3.75 a half box or $7.50 per box, which would make an enormous difference in the income from an orchard as compared with an orchard of the undesirable type. Again, in another case, there were found three trees in one experimental plot of 25 that have borne consistently large crops of the finest qualities for three seasons without any off-type fruits at any time. The unproductive types have averaged about one picking-box per tree of full fruit, mostly unsuitable for shipment; while the best types have averaged about 16 picking-boxes per tree of the highest grade of grapefruit. In other words, differences occurred in grapefruit as remarkable as those which occurred in oranges. Taking the lemon, it was found that in a large orchard of Eureka lemons a similar condition of affairs existed. Several types of Eureka trees and fruits were observed; one, the standard Eureka type tree, was quite productive, every branch being loaded with blossoms, small and large, fruits in all stages of development, at all times of the year. Another type made up of large, thrifty trees, that at first sight would seem to be superior to all other trees in the orchard, revealed on closer examination that these trees were nearly fruitless. A third type which was of compact growth covered densely with foliage, apparently thrifty and undesirable, was found on closer inspection to be almost barren. All kinds of variations and differences occurred. In some, in which the tree might be fairly productive, the fruit produced would be of rough, thick skin and produced mostly during the winter months; in other words, it was undesirable, and in the Chase plantation, out of a total block of 16,000 trees, over 3,000 of the most striking off-type trees have already been budded to the standard, fruitful, and productive types of the Eureka lemon variety.

Do such differences occur among apples or peaches or any of our Eastern fruits? Are there not some trees which come to your mind? We have, for instance, three Spy trees on the Dunkirk

loam soil and for five years we have tried to secure some well-colored fruit from these trees. The trees have been opened up; they have been pruned; they have been fertilized, but we have failed to secure any good quality fruit therefrom; they will set a large abundance of fruit, but it will not color; while this soil type in other parts of the village is producing Spy of excellent color. Why the difference? Is it the local conditions, or is it due entirely to the individuality of the trees? We shall know more about it later, because we have considered this land fit for Spy and have planted a small block not far from these three trees. The individuals planted, however, have been budded from a tree which has the faculty of turning off highly colored fruit.

For two years previous to going to California Dr. Shamel was investigating these problems in regard to our Eastern fruit and in the J. H. Hale peach orchard at South Glastonbury, Conn., during these two seasons he found that if four peach varieties which had the alternate habit of production, not only did he find fruitful peach trees bearing large fine crops in the off-season, but also that these same trees would bear a crop in the general bearing season. In other words, regular fruit-bearing habits were a characteristic of these individual trees. Would the same be transmitted to their progeny? That is the next important question. To what extent will they be transmitted? Is there anything which will interfere with their transmission or are there any factors which it is necessary to control? None of these things to my knowledge has been solved. They are all awaiting solution at the present time.

Can an individual go into an orchard and pick out the best trees? Can a dairyman go into his barn and pick out his best cows without some assistance from the scale and the Babcock test? We have had the latter so well demonstrated that we can generally answer the question with an emphatic No! The former has not been worked upon and naturally we raise the question as to whether we might not be able to go in and pick out the best trees apart from statistical measurement. We look at a tree and it meets our fancy and we say there is a good tree; it looks well; it is thrifty and healthy. We do not know whether it is thrifty or healthy because it is not working or whether it is so in spite of a large amount

of hard work. Mr. R. S. Vaile of Santa Paula, California, and another decided that they would pick out the hundred best trees out of a grove of 2,000 and then keep statistical record to see how near they were correct. These were lemons. After careful consideration they selected 100 individuals as the best in the block, giving due regard to such factors as type, shape and size, and number of thorns and foliage and description of the fruit, including its shape and smoothness, the thickness of the rind and the number of seeds and the various other factors which go to constitute a first-class lemon. A grading record was established for the trees as the final measure of value, the number of fruit which came ripe at a certain time, whether they were green, or light green, or ripe, and also sufficient data was kept in regard to the methods of irrigation and the times, the cultivation and fertilization, with the idea of determining whether such had any influence upon the bearing. In other words, all the factors which they could conceive as entering into the problem were considered. During the first year the special trees selected averaged 13.45 field boxes, 45 pounds each; while the average for the rest of the section, all misses and young reset trees having been eliminated from the count, was 10.25 boxes; in other words, there was an average difference of over 150 pounds to the tree. This striking difference, however, does not necessarily prove that the first choice of trees was perfect or sufficient for bud selection, for the special trees themselves varied from 15.4 boxes to 10.1. The fact that this large variation exists shows the possibility open to successful bud selection, for the difference between the orchard run and the special trees shows an average increase of at least 100 packed boxes per acre or about 30 per cent. The records for the second year were not complete but they brought out several interesting points. The average for the special tree was 5.5 boxes, while the orchard run was 4.5, but 11 of the special trees fell below the 4.5 average of that season and 5 of the 11 were below the average orchard in the first year's record; in other words, 4 of the trees out of these 11 were consistently poor. It is also interesting to note that out of the 5 highest trees, numbers 9, 14, 70, 93, and 86, all but number 9 were the highest in the second year; in other words, there is a certain amount of consistency in the matter of yield and this gives grounds for hopes in the future.

To summarize this work I quote the statement by Mr. Fred Reed of Riverside, California. "I have the figures right here on a couple of trees, the accumulated data for two complete years and a part of this present year. Our tree No. 2, for the average of the three years, has turned off 768 pounds. Tree No. 4 has turned off 443 pounds. Those two trees are not so different that any one who is not an expert passing through an orchard would notice any difference in them, but there is a difference in their production in three years of 325 pounds of fruit. Up there we think we are doing pretty well to get two cents per pound, orchard run, for the fruit. The difference between the value of the product of tree No. 2 and tree No. 4 is something like this: The value of product of tree No. 2 at two cents a pound, orchard run, is $15.36. The value of the product of tree No. 4 is $8.86. There is a difference of $6.50. We have about 72 trees to the acre on our ranch, and if all the trees were of as good a grade as tree No. 2 the difference would be a little matter of $468.00. I think anyone can digest the point to his own satisfaction."

Prof. Hedrick of Geneva in recent bulletins on the question of pedigreed trees, states: "It is very doubtful if apples can be improved by bud selection and the so-called 'pedigreed stock' is probably worth no more than trees grown under general nursery practice." Elsewhere he notes that the yields from the 200 Rome Beauty trees at the Geneva Experiment Station, all of which were propagated from one individual tree, by their wide variation in yield, give food for thought to those who have faith in the possibility of the selection of buds. However, the interesting point is that we have no statistical record of the performance of this parent tree; we have no knowledge of the grounds upon which it was selected; it may have been a tree like number 9; it may have been a tree which bore well one year and then fell down; this matter of record is absolutely necessary before we can prove anything. The fact that one experiment fails to reveal anything does not settle the issue at all, because one individual tree might be better, due to local conditions; it might not be that its value was due to inherent power. It will take a considerable amount of work to settle this question right, and the first thing is to prove that differences occur and occur consistently.

In regard to apples, probably no work is of longer duration than that undertaken by Professor Macoun of the Canadian Experiment Station. The number of trees involved in this experiment is not large, but the records have been maintained carefully for a period of ten years; also the conditions under which the trees are grown are considered to be sufficiently uniform for experimental purposes. The records for the period 1898 to 1908 are as follow:

Wealthy, 17 trees in the test, varied from 59 gallons gross yield to 154 gallons per tree, or 261 per cent. One of the interesting things noted is that two-thirds of the trees fell below the average in yield; in fact, this is the most significant part of the whole record; one-third of the trees did over half the work. Also, it is of interest that the highest yielding trees took the lead the first year. We often hear critics state that if we force the trees into bearing early we may injure their vigor. The results so far do not indicate such to be the case; they do not indicate either in other lines that power of reproduction necessarily means impaired vigor. We may have impaired vigor followed by increased reproduction, but the contrary is not thereby proven. Many of our strongest and vigorous families, so far as reproduction is concerned, are strong and vigorous in other lines and it will depend upon us to select those strains which are not only vigorous in reproduction, but are also able to carry out their reproduction without entailing loss of vitality.

In the McMahon white variety there were 8 trees, which varied from 163 gallons yield to 753, or 462 per cent variation and again the best tree began business early and made a record the first year it bore which it retained throughout the test. In two McIntosh trees one produced 230 gallons and another 501, a difference of 218 per cent. In five Patten Greening trees the yield varied from 209 gallons to 502 gallons or 240 per cent. In other words, in these trials, the variation in yields between the different varieties was from 218 per cent to 462 per cent between the highest and the lowest. We may not be able to raise the average of the whole orchard to this degree any more than in the timothy breeding experiments in Cornell University where it is expected to raise the average yields under field conditions to the same degree to which it occurred in the test plats; but there in the timothy experiments

it has been found to be possible to increase the yield 40 to 45 per cent under field conditions which is an enormous gain. Taking one of our own orchards which was neglected until five or six years ago, the trees being about 30 to 33 years old at the time, about 220 trees in the orchard, we find that the average yield is about 4 barrels per tree, in other words, we have one tree which has produced for the five years, 10, 4, 12, 14, and 4 barrels of apples, that is, first-class fruit fit to barrel, a yield of nearly 9 barrels average. Naturally if the yield of the orchard is 4 barrels there are some trees which are not paying their way compared with such a tree as I have mentioned. We find that there are three R. I. Greening trees which have stood out remarkably for 2 or 3 years and about 6 trees more which come in as of excellent quality in regard to yield, but have some other characteristic which militates against them, for instance, two trees will always furnish a Greening which we can use for exhibition purposes in September, because they are so large that they are attractive, but this fruit does not show as good keeping quality as is found on certain other trees. We have been able to pick 6 barrels of 3-inch apples without any trouble from one tree and never run them through on to the table at all, merely starting the men to pick the 3-inch size and put them into the barrel and head it up; this, of course, is uniform fruit; the tree had been thinned where there was an excess, but wherever the crop is not excessive we do not practise thinning. We secure, however, a certain amount of uniformity which is a decided asset when one comes to the picking season and the rush which attends it. In addition to the 6 barrels mentioned there were four which were somewhat less or which were taken off at the second picking.

We have a currant patch which averaged 6 pounds of fruit per bush during the past year, yet certain individual bushes in the same patch bore 21 pounds; in other words, there are a number of tops and a number which are below the average in yield. I think from this discussion we can realize that it does not matter whether it is apples, lemons, oranges, grapefruit, currants, pears, or any other crop; there are a certain number of average individuals and there are some which are above and some below; there are runts and boarders in an apple orchard just as surely as there are runts and boarders in the cow stable. The case is proven in so far as that is concerned.

The next point is how can we distinguish the individuals and we know of no other means than statistical records of the products. The product recorded for 3 or 5 years is a safe indication in many cases of the possibilities of the individual; this would isolate the best and also the worst. The next factor to consider is whether the individual will transmit. In this connection I may say that if a certain individual which was 100 or 150 per cent above its fellows should produce a race which was 15 per cent better than the previous average that I should consider it a satisfactory and wonderful advance. We never secure as large an average advance as we have individual advance, but any such gain as this would be adequate to make this a very important factor in orcharding. We have propagated from a number of individual trees of different varieties. Taking the Baldwin, and in fact, the same is true of all varieties, a certain individual will produce trees which at one and two years of age are strikingly better than their fellows; these trees have been selected in the first instance because of their yielding power. Now, we notice this variation in ability to produce a one or two year old tree. Of course, with the present standard of requirements, everyone wanting the larger tree, it will become absolutely necessary, if we wish to meet the same, to select the best-growing trees for our work. It is perhaps well to say here that any tree taken from a bearing tree will not make as satisfactory growth in the first two years as would a bud taken from nursery stock; in other words, if we should pass these trees through the nursery row for a couple of years and reproduce from them we could give a much more satisfactory appearing tree so far as the purchaser is concerned; whether it will be any better or not is a question which must be settled by direct experiment.

But to return to our individual rows we find that taking the case of the Auchter Baldwin, which is one of the best bearing trees known to Mr. Taylor and Prof. Hedrick and occurring on the Auchter orchard at South Greece, N. Y., which has been leased by the Geneva Experiment Station for ten years, that the trees propagated from this individual are uniformly poorer growers than those propagated from several other individuals grown alongside. This is not only true in Geneseo, but it is true in the nursery of Mr. McKay at Geneva. Why should this be? The individual

wanting trees and looking at this row would never take them from that one; they would much prefer the row alongside, known as 4.05. In the case of the R. I. Greening we find similar results; stocks grown from the two trees 6.19 and 8.13 will produce a larger number of relatively first-class trees at one and two years old than 5.03 which is grown between them. So far as an experiment this is a very good check; 5.03 produce a uniformly large number of trees about 3 feet when one year old, which are sprawly in growth at two years old and not first-class in appearance; in other words, there would be difficulty in selling these trees. No one would desire them if they saw the others, yet it is my firm conviction that 5.03 is just as good an individual as 8.13, and in the case of other trees which we have tried since, we are finding that we can get better growers than 8.13. In other words, there is a question as to whether vigor in a young tree, and productivity are correlated in any degree or whether they are antagonistic. I feel that it is possible to select individuals in which both will be found.

One of the most striking illustrations of this is the strain of Duchess of Oldenburg, which has been taken from two or three owned by the Collamer Bros., Hilton, N. Y. Here we find no difficulty in securing 6 feet tall and well-branched trees when headed low and strong and stocky, which are strikingly uniform, whereas it is much more difficult with other selections to secure a height of more than 5 feet and a lower caliper. This is a strikingly vigorous lot of trees and we know that they have been wonderfully productive; the original trees are now of good age and, strange to say, are top-worked on some other variety. Has this added any vigor to this strain or is there some inherent power? So far as we can find these Duchess were selected and top-worked because of their good bearing power; in other words, Have we found an individual which has ability to transmit its characters and is both vigorous and productive at the same time?

One strain of McIntosh we have from Mr. Teator of Red Hook and also a Baldwin from him are strikingly vigorous; also a Baldwin which we secured from Mr. De Los Tenney of Hilton, has shown wonderful vigor in producing a two-year old. Now these trees are well checked because we frequently will run one row then repeat it at a distance of six or seven rows apart and they stand out

as markedly as steps. Again, by selection in the nursery row we can get a crooked variety to grow straighter. We have a strain of Bosc pears, which while generally recorded as a very poor grower, is producing a relatively large number of straight trees and just as strong growers as we can find in Bartlett; this, however, is the exception. We know that these Bosc are from good individuals; in other words, we are at the present time propagating from three individual trees, all of them of the best strain of Bosc and all excellent individuals and to us it seems that they are showing ability to produce a good tree and are from heavy producers. To what extent they will reproduce the latter power, of course, we are not yet aware.

We have a number of orchards planted from individual trees; in some cases we have these top-worked; in others we have the young trees themselves. Our earliest records will be secured from varieties which have been top-worked on others. Here we find that Greenings which have been selected because they were green and maintained their green color, and because of uniformity in size and ability to yield are transmitting those characters. We have Greening trees which are four years top-worked which this year bore 182 and 179 fruits and every tree bore some fruit, from 40 apples up to this number. The tree number is 3.15. The Baldwin 3.03 has also shown ability to make a rapid growth and come into bearing early; in other words, we have a large number of trees which are four years top-worked which have borne a nice lot of apples this year.

Incidentally, I may say that I am not at all in favor of top-working. We find that this merely delays bearing instead of causing the trees to bear earlier; in addition, it is a considerable amount of work and very unsatisfactory. It will often take three years in order that all of the block of trees may be worked over. It results in dwarfing the tree and on the whole is detrimental. It does not matter whether the top-working be done in the orchard or in the nursery row, the evil results of excessive pruning are apparent in both cases. In one block of Hubbardston which we top-worked we found a remarkable variation in the color of the wood produced, that is, on some trees the wood would be of a light-brown color, and on other a reddish-brown. There was so much differ-

ence that we finally decided to select a certain type for all future propagation in order to get more uniformity. What caused this breaking-up? I do not know, whether it was the influence of the stock on the scion or whether it is merely that the variety Hubbardston is ready to break up in this particular character; whether it would have any bearing upon the fruit I cannot say. We have not yet proceeded far enough to determine this feature. In the case of the Northern Spy we notice considerable difference in the trees; certain Spys produce wood, which is light-brown in color, extremely thin and willowly, and in such cases the trees do not seem to make as much growth as in others. Another type of Spy which is much stronger in growth has reddish-brown wood. Now, whether these things can be correlated with productivity or not I cannot say; we have not proceeded far enough to determine any such conditions, but there is no question so far as furnishing wood is concerned that the reddish-brown tree which we find in our own orchard is the one from which we ought to work; the light-brown tree gives a much smaller growth and would not be as acceptable to the average purchaser; whether it will be as acceptable later to the orchardist I cannot say, perhaps it may be, perhaps not.

I may say that the Spys sent out by Mr. R. L. Hemenway of Bridport, Vt., have the light-brown colored wood and his Spys have sold as high as $14.00 per barrel; a number of them have this character and make a relatively short growth in the orchard. It would seem to me that there is excellent opportunity for the selection of types of Northern Spy, in fact, there are so many strains that we can practically find varieties in this variety. It is also a possibility that we shall find that certain strains are better adapted to certain districts than others. Of course, there is no apple on which soil has a greater influence than the Spy. If planted on very heavy land it grows a close-bunched tree, shooting upward straight and thick and bushy, the fruit being greasy and lacking in color and quality. On the other hand when grown on shaly land, especially limestone shale and soil not too rich, we shall find the tree making a much more spreading growth and higher color resulting. There is not the same necessity to prune, although the man who prunes in the former case will merely add to the troubles,

unless it be a certain amount of judicious work in the summer. Excessive winter pruning would merely result in disaster.

A few of the best colored Spy trees in Geneseo, or rather trees producing the best colored fruit, are inclined to be of the light, willowy order and not the thicker wood growth. Here, it would seem to me that the orchardist and the nurseryman might have different ideals, for from the nursery standpoint, where one desires to sell wood, one would naturally select scions from the heavy growing tree. At the present time we have strains of our own and from Bridport, Vt., and also one from the Bradley tree in Wyoming County; it was from this tree that Mr. Pat Gleason, formerly well known as an extensive apple operator used to select his fruit for a great many of his shows, and it was fruit from this tree that won the prize at the Paris Exposition. One would judge looking at this tree that it was not ideally located, for Spy; it is situated down on the valley floor, on a gravel loam soil; the tree has been planted in among others rather close and shaded somewhat, and yet, it has a local record for producing some of the highest quality best colored fruit grown in our vicinity.

Is it local conditions or is there individual merit in the tree? We hope by planting from this to secure data, but when? Ten years from now? Perhaps twenty? We cannot hurry this work, it is a slow piece of business at the best. We cannot tell definitely anything about it, until we have data which can be secured only at the expense of considerable time to say nothing of money. Is the game worth while? That is the question of a great many. One thing is certain: By selecting buds and wood from such trees we know that our variety is true to name; otherwise, we are losers if there is no benefit from heredity, because the same buds from the nursery would produce a larger tree at the end of two years than we can possibly secure from these individual bearing trees; and it is quite possible that my friend, Prof. Hedrick of Geneva, is right when he tells me that I am merely wasting my time and money by chasing after trees of this nature; in other words, I am gratifying a dream, but I have faith and am going to pursue my vision.

Now, I am going to leave this, because two or three have asked me more or less about the business of planting trees, and what is probably of equal importance, the care of the tree after you have it.

Some prefer a one year old, some prefer a two: some prefer a big tree, and some would prefer this $\frac{5}{8}''$ tree. Nearly all trees are sold by height, measured from the point of insertion of the bud to the tip, and their caliper taken at two inches above the bud. That is the diameter and they are sold as $\frac{11}{16}''$, $\frac{5}{8}''$, and $\frac{1}{2}''$ or whatever they happen to be and their height. If you want to know how to order intelligently you can buy that way. You get an idea then of the size of the tree. Also, it is well to know their age. A great many men write me that they want buds. Here are two trees (indicating). Which would you take? So far as the roots are concerned, the roots are of equal age. The only difference is that this one is a root graft and this one is a bud. In the case of the budded tree the seedling was planted in April or May and in August or September a bud was put in the stem. The following spring the top was cut off and the bud grew and made the trunk and eventually the tree. In this case a root was taken and a graft or small piece of wood of the desired variety was put in it. It was planted in May, just the same as the seedling and grew into this tree. Which do you want? How do you know which you want? (Laughter.) Don't you think there is a lack of knowledge as to what you want? Some men want the bud, some want the graft. We try to give them just what they want, then they are satisfied? They may be, and they may not be, but in many varieties we can grow a bigger tree in the time from a graft than we can from a bud. Why? I think that explains a fundamental principle in causing an orchard to come into early bearing. In the case of the graft we planted the little tree and it grew and was never touched; it was left alone. In the case of the bud, we grew the seedling tree for a year and then cut the top off and lost all that year's growth and it never got over it. And if you want a very good illustration of the effect of pruning, severe pruning, just take two or three trees and top-work them. If you can get any more discouraging situation in an orchard than to top-work them I don't know of it. In other words, top-working apples appeals to me about the same way as when a little boy came in and told his mother "Mother, Tommy Jones says Daddy has got a big head." "Well," she says, "go on, go on. There is nothing in it." (Laughter). Don't get into top-working. The less pruning you can do to the

young tree until it bears, the better, and the sooner it will bear. I have no use for summer pruning, and I don't think you need it. I am talking now from New York, my own conditions. You can use what you like of it, but it seems to me that anywhere the less pruning you can do, the better.

Shall I prune when I plant the tree? No, plant your tree and take off the limbs you don't want. If you can form your head do so. If you don't want all the limbs, decide which you are to save, three limbs and a leader, perhaps, and if you can possibly make the head when you plant it do so. Take everything else off, but don't cut back limbs you leave; don't cut them back. Why? I know that you all differ, and that is what I want; I want a good discussion. Now why? This terminal bud will start into growth ten days earlier than any of those lower down and you can't afford to lose that ten days, especially in the first year. In your heading try to have limbs distributed at least six inches apart on the trunk. If you begin your heading at 18 inches, then go up 10 or 12 higher for your next limb and so on. Make No. 1 at 18 inches or probably 2 feet, No. 2 at 2 feet 6, and then 3 feet, probably; get your head distributed. If you get them all close together and the variety is Spy, when it comes into bearing it will tear right down and crack open. The distance the limb is from the ground will never be greater than it is today. As the limb gets thicker, the lower portion grows nearer the ground.

I believe in low-heading. It is business. I believe in three or four limbs, and the leader in certain varieties, varieties which are apt to tear down, varieties in which you want shade in the tree, such as Greenings, where you want to keep them green. I believe in an open-headed tree in varieties where you want color, especially if your conditions are adverse to spreading the tree. In other words, with us, if our soil is heavy, our Spy tends to grow thick, branches bunched together. Under such conditions I would try to make an open-headed tree. As a rule then for our conditions the Spy head is open, the Baldwin is open, the Greening and the Wealthy would be left with the center in.

My contention is that if you will leave the limbs alone and not cut them back, they will fill up with fruit spurs and come into bearing quicker. We have Baldwins five years planted bearing

1½ bushels. There is an orchard nearby which has been handled in this way, and an orchard of Hubbardstons, which at four years picked half a barrel. Some of the Baldwins did the same at five and every tree in the orchard was bearing.

We are going to follow a system which is suited to the times, and are not going to follow the previous methods. Until a tree was in bearing I would not prune it any more than to probably take out a limb that was interfering. The early bearing induces a normal spread of the branches. We have trees five years planted, Greenings, which are bearing and have a ten-foot spread. We have Greenings which have been propagated from individual trees which give me faith in the value of selection, because we selected Greenings which maintained their green color and on the young trees, apples which were left on until November retained their green color. Every tree of one block, 3.03, was bearing at four years, one of them had 179 fruits and another 182. With some trees you will have to take a couple of years to form the head, the limbs may be too close together to leave them all.

The ordinary nursery trade calls for a tree to be trimmed up to 30 or 33 inches high, which I think is a mistake, but the trade calls for it. The head is then too high.

Now as to planting. If the trees are dry when received throw them into water, root and branch, and leave them there 24 hours before planting, taking them out as needed, or heel them in in wet ground. Plant just as soon as you can after you get the tree; don't wait for the land to dry off so that you can cultivate it. Get the trees in early and pound them tight. Don't go chopping off a lot of roots. I would n't take off any more roots than I had to. If the root is damaged I would cut it back a little, but I would n't take any more off. Dig your hole as small as you like, jam the roots in and pack them tight; get the biggest man you have and keep him busy tamping. If you don't get them tight that way, take a fence post and tamp them tight. The main thing is to place the soil in touch with the root so that the water will move from the soil into the plant. Now, it can't move through an air space, and you want that plant to grow just as quickly as you can in the spring. If they are pounded tight, moisture circulation is established and the tree begins to grow as soon as possible; do everything you can

to bring about that result. Leave the buds on, which grow first, leave all the roots on, get it in the ground as soon as you can and cultivate it just as much as you can, once you have it in. Then you can grow an apple tree. You will not only have them growing until July, but you will have them growing until August. Then you can make it grow, in spite of what I heard yesterday, that your trees quit in July. I never had trees celebrating the Fourth in that way. (Laughter). I would have them take a new lease of life right off and do business.

Funny things happen sometimes: I had some trees returned by a lady in Ithaca. She bought a small order and I was very much surprised to have a letter back saying that those two-year-old trees that I sent her were four-year-olds. I said that was impossible, I knew where they came from, and I would give her a dollar a piece for every four-year-old tree she sent me. They had made a fall growth, as well as their spring growth, and those folks did n't know it. (Laughter). Now, know what you do know; to be sure of what you know, and then you are ready to go ahead. Know that you are right and go ahead in this business. The whole thing will depend upon yourself; you will have to pay for it. Get all the advice you can, and use your own judgment and get wise to all the propositions you can before you go in, and if you don't know, if you are not positive what you ought to do, you ought not to go in the fruit business; keep out. You can go out of the business all you like, enough will stay in.

I don't think that as an organization we ought to go telling that everybody should go into fruit-growing. We don't want everybody in. We want those men in that will do the most good. This idea of filling the country up with a lot of people is not real economy, not rational. We don't necessarily want the little farm well tilled; we want the efficient farm well tilled. In our section a 200-acre farm properly run will turn off more stuff to the city than will four fifty-acre farms with families thereon. The measure of economy is the amount you produce, and the cost at which you produce it. There is an economic side, and that economic side is going to prevail in spite of everything. There is the economy which unwittingly you will be forced to recognize, and the man that has conditions right for growing Greenings should grow Greenings; the man

that has conditions for growing Gravensteins should grow Gravensteins. Find out what you are going to do; find out what you are capable of doing, and then do it. There are climatic conditions that you can't change, and those you must recognize; there are soil conditions that you can influence, but which you must consider; and the adaptation of variety to your conditions is just as important as the recognition above mentioned. You must consider all and then go ahead.

I thank you. (Applause).

Discussion.

Stenographic report reprinted from the Report of the 19th Annual Convention of the Massachusetts Fruit Growers' Association, by courtesy of Mr. F. Howard Brown, Secretary, Marlboro, Mass.

President Farquhar. Ladies and Gentlemen: I think that Mr. Fraser may have left the platform too soon; I think that he is so thoroughly convinced of what he knows that there are a great many people here who would like to get opinions of him, and I am sure Mr. Fraser will be glad to reply to those who may have such questions to ask him.

Mr. H. L. Frost. I would like to ask Mr. Fraser what varieties he would carry a leader in.

Mr. Fraser. Rhode Island Greening for one. I would have the leader in Greenings for the simple reason that the best market for the Greening requires a green apple. They will pay more in New York for a green Greening than for one that has a blush, for good and sufficient reasons, and we can secure more shade with a leader in and also stop the trees spreading easier by leaving it in. I would leave it in the Wealthy, under all conditions, because the tree is apt to break down. I would leave it in McIntosh where it does well. I would leave it in the Twenty-Ounce, under most conditions. Does that answer it, Mr. Frost?

Mr. Frost. Yes. Is that the whole list you would recommend leaving the leaders in?

Mr. Fraser. I don't know. Give me varieties that I have worked with and I will answer.

Mr. Frost. How about the Yellow Transparent?

Mr. Fraser. On the Yellow Transparent I think I would, because of the fire blight. I have grown the Yellow Transparent, both in New York and New Jersey, and I have n't been very particular about it. I have rather let the tree head itself, because it was planted as a filler.

Mr. Frost. Duchess, Spy, Baldwin?

Mr. Fraser. Duchess. I would n't mind; not particular about that. But on Baldwin, I would n't for our conditions; I would n't leave it in. I would rather have it out. On Spy I would rather have it out.

Mr. Frost. Wagener?

Mr. Fraser. Leave it in.

Mr. Frost. Jonathan?

Mr. Fraser. We don't grow it; I am not well enough informed about the Jonathan.

Mr. Frost. King?

Mr. Fraser. You can leave it in the King. I don't mind about the King, the tree tends to grow open and when it is in good shape and the fruit colors well I should leave it in and if it was n't I would open it up. The King wants a lot of color. There is one thing that you must realize. The eastern part of the state of New York and New England have a great deal more sunshine than we have in western New York. Bear that in mind. You may have more trouble from sun scald than we. The Ithaca Station reports 85 days of sunshine for the year at Ithaca, while the Hudson River stations report 180 days. We have got conditions there which may render our management somewhat different than yours.

Mr. H. E. Chase. I would like to ask what assurance we have that the people of New York will always want a green Greening?

Mr. Fraser. I think we have a good one. If you go into New Jersey you will find them planting the English Codling and the Monmouth Pippin. They look something like a Greening; both are large and he Monmouth Pippin has a red cheek, and the women of New York have recognized that those red-cheeked things that they bought for Greenings are not nearly so good cooking apples. In other words, the Monmouth Pippin masquerading as the Rhode

Island Greening is n't a very good proposition, and the women are beginning to discriminate, and just as soon as the Monmouth Pippins are grown and sent into New York the women are going to say, "No; no more of the Greenings like those." That is the proposition. There are business reasons underlying this Greening business.

Mr. Moore of Arlington. You speak of a large percentage of trees not bearing fruit in the orchard. May I ask if they grow wood at the expense of the fruit, and if so, if you have ever practiced root pruning? I ask this question because I planted some Japanese Plums and there was one tree that made three times as much wood as any of the others, but it did n't bear a plum until I cut it, say, six or eight feet — I have forgotten just exactly the distance from the bottom — and I dug out clear around it eighteen inches deep and cut off every root I found. I dug that channel, and from that time on that tree bore excellently.

Mr. Fraser. Summarizing the question, it really means would root pruning not be a remedy for the trees which are making a large amount of wood and bearing little fruit. I have never tried it. I have felt that we did n't need it to any extent. I have n't tried it to any extent in this country. I am familiar with it in Europe, under their conditions. Over there I know how much it is used, but I have not seen it in use here to any extent, and I don't think it is a commercial proposition. That is only my personal opinion, though. I think it might be used in small plantings with profit. I think if you are going into a commercial proposition it is very much easier to girdle the trees, rather than prune the root. You can, of course, girdle them very, very quickly and you are sure to make them bear. Just take a ring of bark off the trunk or limb in June, an inch, or ten inches if you like — it does n't matter on a big tree — you can do a lot on an old tree, taking out quite a chunk without harm. It will heal over in a day, while the sap is running. It will do very little harm at that time. At other times it will kill the tree.

Mr. Bogue of New York. May I be pardoned if I answer the question of the gentleman who spoke about the Japanese plums? It is purely a technical question and I want to assure him that

what he did on that plum was just right The Japanese plum requires more of that than any other variety, because it is a surface feeder and he did just the right thing to cause it to fruit.

Mr. Hulse. I have seen an old orchard badly sunscalded. I would like to know whether to have a tree doctor, or shall we cut them down and re-set them?

Mr. Fraser. Where is Whetzel? (Laughter). Why, Professor Whetzel has done a great deal of work in regard to fire blight and canker, which are somewhat similar to the sun scald, and he has cut out the injured bark and tarred over the cut surface and practically renovated several orchards in Western New York. He has done a lot of work in that way, cutting out to the sound, healthy wood, giving good cultivation and spraying, and brought the trees back. There were some excellent Kings near Ithaca which were nearly dead and he has brought them back.

Mr. H. L. Frost. This is from the question box: Would you put peaches in among apples on a south-southwest, rather sharp slope?

Mr. Fraser. That is a local question. Now, I have no use for them among apples, personally, but that does n't answer the question for New England. Perhaps someone here will answer that better than I can. I have no use for them because the peach trees shade the young apple trees, and the latter do not get the right spread. It makes them contracted, and if you have Baldwin trees you want them to spread all they will. The Baldwin grows up close enough, so I have no use for peaches. Greenings will grow out, but on the whole I do not like them together. Perhaps some other gentleman will answer that in more detail.

Mr. Wilfrid Wheeler. What do you do with your one-year-old tree when you set it out? Do you cut it at all?

Mr. Fraser. (Indicating on young tree on platform). What will I do with this? Take the top off at about 33 inches from the bud and rub off every bud below 18 inches and let the rest start, i. e., those between 18 inches and 33 inches, and the next year form the head, if it has started enough limbs. If not, you will have to take a little more time to get it going. That is the proposition with the one-year-old.

One other thing I might mention. In our own planting now we put a wire guard on the tree immediately after planting. The one from which we get the best result is made by the Clinton Wire Cloth Company, New York, they are the lowest priced. The guard is 18 inches by 13, and we feel that it will last five years. It costs us five cents, put in place. We would rather do that than mound our trees or take any other means, tar paper or some such thing, to keep the mice off. Just keep the trunk clean of limbs for 18 inches. We look at our trees twice a year for borers, and if we find them we take them out while they are small. Does that answer it?

Mr. Wheeler. Yes.

Mr. M. C. Burritt of New York. What general planting would you advise, one-year, or two-year old?

Mr. Fraser. For general planting? Two or three gentlemen in New England who have tried the one-year old claim that they prefer the two-year-old. For commercial planting in New York I am using the one. I don't think it matters a great deal, so long as you get vigorous trees, whether they are one year or two year. And, by the way, the two-year root graft is the same age as the one-year bud, and the three-year root graft is the same age as the two-year bud. These trees are practically the same and probably unless the differences were shown to you you would n't know one from the other.

Mr. Fraser of Massachusetts. I would like to ask Mr. Fraser if he would preserve the suckers on his trees and cut them back, to form a shade for the boughs?

Mr. Fraser of New York. We have tried to cover the branches in old trees which have been allowed to run away out to the end by saving the suckers which start on the side and topping them back and leaving them in, trying to make fruit spurs. We have tried that, and I think it is quite practicable in some cases, especially those that come out of the side in this way (indicating), which can be made to clothe the limb, so to speak.

Mr. Fraser of Massachusetts. In case there might be danger of a branch breaking, might not one of these suckers be trained as a leader?

Mr. Fraser of New York. I have never done it, but I don't see why it could n't be done. There may be someone here who has; I have never done it.

President Farquhar. Any other questions?

Mr. Fraser. Mr. President, I would like to take this occasion to thank the members and the people of Boston on behalf of my colleagues and myself for your kindness, your hospitality, and the manner in which you have entertained us and greeted us, and I certainly am very glad to be here to express to you on their behalf and on my own our appreciation thereof. (Applause).

Mr. H. L. Frost. Might I ask Mr. Fraser if he has ever experimented with dynamite in any way for the young trees?

Mr. Fraser. Look here: You will get all my bad doings out of me yet if you keep at it. (Laughter). I have made so many mistakes, that I don't want to own up to all of them. I have made as many mistakes as anybody else, and some more. I knew a gentleman who wanted to plant an orchard in Vermont last spring and desired to use dynamite. He wanted me to look it over. He dynamited and we are not sure yet as to what the results will be. But I am afraid that in many cases we got a hole which remained below ground, and when the water dried out we had a hole which the roots could n't bridge, with the result that those trees sank considerably during the season, to their detriment. Also, in one or two places where the hole has been made at the time of planting instead of probably six months before there has been a higher mortality than in the case of trees not dynamited. So that under some conditions you may have trouble from dynamiting in that way. Also, I would question the value of planting apples on land that needs to be dynamited to make it apple soil. I question very much whether you are not going to be beaten in the game. We have considerable faith in Western New York in under-drainage of our lands in order to make them fit for apples, much more than we have in dynamite, although I am willing to be shown.

Mr. Nelson of Wellesley. What is your idea about scraping?

Mr. Fraser. Oh, if you are attacking a run-down orchard for the first time, and you think you have a lot of codling moth under the bark, I would scrap them. It will be all right. As a general orchard proposition, where the trees are well sprayed, I don't think it pays.

Mr. Fraser of Massachusetts. I would like to ask Mr. Fraser what he thinks about putting a potato crop in the orchard. In

bringing back an old orchard that has been neglected for a number of years and has n't been plowed for fifteen or twenty years, would you advise that, to help cultivate the land?

Mr. Fraser of New York. Is it doing well now?

Mr. Fraser of Massachusetts. No.

Mr. Fraser of New York. Are the trees past redemption now?

Mr. Fraser of Massachusetts. The trees are redeemable.

Mr. Fraser of New York. I would be inclined to try it. I would like to see it first, but I would be inclined to try it.

Mr. Fraser of Massachusetts. The reason I ask is more because I feel that there may be some that have not tried it. I have tried it with great success, and the profits derived from the potatoes paid for the cultivation of the orchard.

Mr. Richards of Marshfield. I would like to ask the speaker's opinion as regards orchard planting in sod and kept in sod.

Mr. Fraser. All I can say is that there may be conditions where that is good business. Since you are running your business you ought to be able to determine from your greater knowledge whether your conditions are right for that. It has already been mentioned that Mr. Grant Hitching at Syracuse, N. Y., has a very profitable venture in an orchard in sod. Mr. Cox and Mr. Vergon of Ohio have very good results from orchards in sod. In other districts there seems to be a feeling that is fairly well proven that cultivation is better. I think it is a local problem.

Mr. Roberts. Is it better to cut back an old orchard, or set out a new one?

Mr. Fraser. We found on some of our big trees which were occupying the land for a long time that wherever a man had to go up over 30 feet to get the apples the cost ran up to 60 to 75 cents a barrel to pick them and it was better to cut them off right at the ground.

A voice. Why not discharge the man that cost so much as that to pick them?

Mr. Fraser. Well, I thought I would make sure that he would n't be doing that work any more. (Laughter and applause).

Mr. Favre. In setting out an orchard for Baldwins would it be advisable or better to intersperse those with some early varieties, or set them in all in one block?

Mr. Fraser. With the object of cross-pollenation? We have no evidence that Baldwins need a pollenizer. Personally, I believe that the Rhode Island Greening does in an unfavorable year in Western New York, and for that reason for Rhode Island Greenings I have planted Baldwins as pollenizers, and in no case have we any varieties wider than four rows. I have used Baldwins four rows and Greenings four rows, Baldwins three and Greenings three, although I suppose that if I did n't have the particular type of soil that I have I could n't do it. The Baldwins do the best with us on a sandy loam, and the Greenings do best on a clay loam, and it is only because we have a loam soil that we are able to do this. But I don't think that the Baldwin needs any other variety.

Mr. Sylvester. I would like to ask Mr. Fraser how he feeds those trees to get half a barrel of apples at four years old?

Mr. Fraser. We have given them the year they were planted about three-quarters of a pound of a mixed fertilizer around the tree, acid phosphate, muriate of potash, and nitrate of soda, something like 5-8-8, three quarters of a pound to one pound to the tree, the first year, and some manure in the fall, and then we have grown a crop in between which we have fertilized, potatoes or beans, and we have tried manuring the land every year, six loads to the acre. We have put on half a ton of slag to the acre lately, and just kept them humping generally. (Laughter). If a tree was n't growing, why, it got looked after. I would use a little nitrate if necessary, to keep them growing in the spring, and all the manure you can get. It is a good, safe proposition.

Mr. H. L. Frost. Would you give us the varieties you think need pollenization?

Mr. Fraser. I have no evidence of any which have a direct need, other than the Rhode Island Greenings, of the varieties we are growing, which are Greening and Baldwin and Spy, although with the Spy I should put a pollenzier if we had one which blossomed at the same time. But it is difficult to find one that blossoms with it, usually. The fillers we have are Wealthy, Yellow Transparent, Twenty-Ounce, Hubbardston, McIntosh, Maiden Blush, Boiken, and Wagener. I don't know that I have any evidence that they need pollenizers, but there are enough varieties planted so that they will get it if they do.

Mr. Voles. I would like to ask, on a sandy soil, very gravelly, sandy soil, if there is any use to try planting apple trees with about a foot of loam over it? It is coarse sand underneath about a foot of loam?

Mr. Fraser. Plenty of moisture in it, or not?

Mr. Voles. Well, I can get plenty.

Mr. Fraser. I think that would be a better question for the Bureau of Soils or the soil man in your station, because he would be familiar with the local problems. But we have lots of sandy land growing apples in different places. I don't know that I could answer that to any advantage to you.

Mr. Kittredge of Mount Vernon. I would like to ask Mr. Fraser what he thinks is the best cover crop for a young orchard?

Mr. Fraser. Under our conditions we have tried a number of things and have tried to rotate. In years when clover was dear, like last year, we have used four pounds of Dwarf Essex rape, costing us 24 cents an acre and we got a fine growth, a big mat of stuff, which turned in plenty of humus. I have tried hairy vetch, and in the case of a young pear lot I pretty nearly brought disaster on the whole business, because the hairy vetch got to taking the water away from the young trees, and since half that block was in vetch and half in buckwheat, we had a very good test. The buds on the portion in hairy vetch started badly in the spring and then went back and were a whole month late, seemingly due to the fact that the vetch took the water supply from the pear and injured the proper maturing of the buds, the dry fall causing that condition. Therefore I regard hairy vetch as quite uncertain. I got the same results in New Jersey, so that I have cut it out entirely. Now, we are trying probably buckwheat and clover, rape and clover, or we will put in half a pound of Cowhorn turnips and two pounds of rape and two of crimson, and two of red clover, or, if the red is very dear, a couple of pounds of alsike clover. You can use all kind of things, and all the pigweed and redroot, and any other things that you can get to grow. I think the best compliment ever paid me was at a Grange meeting where they got me in and a man said, "What have you got in that field along the Mount Morris road?" And I said, "That is a currant lot." He said, "Currants! Why, I think it is the most disgraceful condition there is in Geneseo.

You can't see anything but pigweed, and that would hide a horse." I said, "That is just what I was looking for." (Laughter and applause).

A member. I have an orchard twenty years old, of Baldwins, and I want to graft it over into an early summer apple. Is it feasible to do it?

Mr. Fraser. No, sir. If you have got that bug, just try it once and watch, and if I were you I would n't try it more than once. (Laughter and applause).

Mr. Warren of Whitman. I should like to ask Mr. Fraser if you had a chance to buy a parcel of land which had never been plowed because it was hilly, what could you afford to pay for it if you wanted to put it into apples? It will bear apples, no doubt about that.

Mr. Fraser. I don't know what you could afford to pay for it, but I would rather go and take land somewhere that I could control the situation a little better, personally. I don't know that I can answer that, as to what you could afford. Personally, if I had it and I thought you were a good customer, and your money was sure, I would let you have it. (Laughter).

Mr. Carter. I would like to ask the speaker if he can give me any formula for feeding young trees for early bearing.

Mr. Fraser. I think, gentlemen, the whole thing is just seeing what the trees will respond to. Now, my formula is no good; I have n't any. Try something on a piece, if they respond to acid phosphate and muriate of potash and nitrate of soda, and it is keeping them going, put it on. We have used basic slag, putting on half a ton to the acre, and we left enough trees without it to check by, which we could see the difference in just as though we had marked it out, where the fruit and foliage and everything else was different. But I don't think it would have given the returns unless it had had the land built up with several crops of weeds and organic matter and had manure at different times and been underdrained and a lot of other things. There are just six letters in the formula: B-r-a-i-n-s. Brains. (Applause).

Mr. Richards. What do you think of dressing an orchard, putting on stable manure? All the college men advise putting on sulphate of potash and ground bone. I have used them together. I want to know just which is best in your opinion.

Mr. Fraser. I have n't any opinion. Perhaps I might give you a story, if you ask for my opinion on that. A poor old colored woman was brought before the Court for abusing her child. The Society for the Prevention of Cruelty to Children had a very strong case and it looked bad for her. The Court said, "Have you anything to say?" She answered "Can ar arsh your Honor a questhun?" The Court nodded assent. Turning and looking at the Judge, she said, "Was yoor Honor ever the parient of a pufficly wuthless colored chile?" (Laughter and applause). You see, the authority needs to be competent. (Laughter).

Mr. Powell of Springfield. Mr. Fraser said that in pruning his two-year-old trees he would n't cut off the terminal bud, but in pruning the year old he would cut it back. If you are going to set the trees like Greenings where you want a leader, what is the object of cutting back and training up a new leader?

Mr. Fraser. I cut it back because I want to start branches below. That is the only reason. If some had started already I never would have cut it back in the case of the Greening. Only on that particular tree there were none, and so I topped it back to start some, that is the only reason.

A voice. Which would you prefer; stable or barnyard manure, or commercial fertilizers for an apple orchard?

Mr. Richards of Marshfield. I hope you will answer that question; you have n't yet.

Mr. Fraser. I would put them all on. (Laughter). I will tell you just the way it is: If you go to call in a Chinese doctor, the first thing he does is to look over the patient and see what he can bear. If he has two cash then he has so much medicine; if he has 100 cash, then he can have so much more, and if one does n't kill you the other will. (Laughter). I would size it up by the gentleman's pocketbook, and if he wants to try them all, try them all. If he must spend the money let him go to friend Wheeler and bring his money and buy a carload and use it all.

A voice. That is a practical question.

Mr. Fraser. It is.

A voice. Some of these college men here in Boston tell us, and have told us in years past, that those people who use commercial fertilizers in growing their apples will grow a great deal better

apple than we in our section, who use barnyard manure. For the last three or four years I find that those apples that grew in stable manure, on land manured continuously for the last twenty years, were keeping better, with better shape and color, than those that grew on some other soil. So it is a practical question for me and a question which I am not fully decided on.

Mr. Fraser. I think the question really comes back to the individual involved. The fertilizer problem is a local one. If you are getting good results from any one thing, I would stick to it. I can't really answer for sure. I know just what I would do in my locality. I know that for my peaches I will put certain things on, for my peaches I will use basic slag; I am satisfied. A man can't sell me acid phosphate for it. On my apple trees, if I have manure I will put some on, and I know I will put on basic slag. I have proven to myself that that is paying me. In a few years I may find that I need to change, and just as soon as I can prove to myself that I can change with profit, I will change. I find that it pays me to lime some pears, because I have limed part and have not limed part; I am going to lime more. The only way I can see that the question can be solved is to go to the land with the question. I am using fertilizers of all kinds and all the manure I can get; but I am getting returns, and I do feel that fertilizer with manure will frequently give better results than manure alone. In many cases they will give better returns combined. Really, to be candid with you, I think that you will have to solve it yourself.

A Voice. I understood when I got up to ask you a question in regard to that grafting I spoke of, that you objected to it. Why do you object to that method of grafting? I did n't learn anything from your answer. It was in regard to that twenty-year-old orchard that I want to graft over.

Mr. Fraser. Why, on any work of that nature that I have seen, unless the trees are already low, they are apt to shoot up, and there is considerable work and a lot of difficulty. I don't want to run that question down, because it is entitled to a proper answer. Top grafting is an awful lot of work. I tried it on a lot of trees, and I am sorry I did it. I am giving you my honest conviction on the proposition. If I could possibly avoid it I would never do it.

A Voice. I realize it is going to be a lot of work.

Mr. Fraser. Not only a lot of work, but you will have limbs in there for five years that won't be working and you will be fussing over it with two varieties on the trees and an awful lot of trouble and bother, and I don't think it is worth while in these days; I don't think it is worth while, don't think it is commercial.

A Voice. You don't think but what we can grow good apples that way?

Mr. Fraser. No question but that you can grow them. The only question is, can you grow them commercially at a profit?

A Voice. If that were the only piece of land you owned, would you do it?

Mr. Fraser. What variety?

A Voice. Baldwin.

Mr. Fraser. I would never do it; I would never change.

A Voice. That is all right for you, but I know I want the other kind. You want Baldwins and I want the other kind.

Mr. Fraser. Can you not possibly find some man that wants Baldwins and sell to him and buy a piece of land with the money?

A Voice. I could sell him the trees, but not the land.

Mr. Fraser. I would make business business, and cut out sentiment. I don't think sentiment is business.

President Farquhar. Any other questions while Mr. Fraser is still on the platform?

Mr. Edward B. Wilder. We have heard a very instructive address today and it is very hard to express our appreciation of all the information that has been given to us but I would like to move you, sir, a most hearty vote of thanks to Mr. Fraser for his lecture and also for the discussion here on these very vital themes.

A Voice. Second the motion.

President Farquhar. You have heard Mr. Wilder's motion, moving a vote of thanks for Mr. Fraser for this practical and valuable discussion. All those in favor of this motion will signify by rising.

(Motion carried unanimously by a rising vote).

(Convention Adjourned).

FACTORS INFLUENCING THE FORMATION OF FRUIT BUDS IN APPLE TREES.

By Prof. B. S. Pickett, University of Illinois, Urbana, Ill.

Delivered before the Society, February 1, 1913.

The apple tree produces two distinct kinds of buds, fruit buds and wood buds. As the blossoming season approaches it becomes comparatively easy to distinguish one kind from the other by the greater size of the fruit buds. At earlier periods it is more difficult to distinguish the two sorts of buds with absolute certainty unless one makes a microscopic examination which involves some nice laboratory technique and apparatus not at the disposal of the orchardist. There are, however, certain differences between wood and fruit buds which enable us to identify them with a reasonable degree of certainty at any time after the first of September. Wood buds are located along the sides of the shoots, that is, on the sides of the wood of the current season's growth; and usually the shoot terminates in a wood bud which continues the growth of the branch the next season. The terminal wood bud may be quite large but the other wood buds, the lateral buds, are small, pointed in shape and lie close to the shoot. These lateral buds form in the axils of the leaves at the places where the leaf stalks join the shoot. The fruit buds of the apple, on the other hand, are always found right at the end of a branch; never on the side. The branches which bear the fruit buds are usually very short, seldom, indeed, more than half an inch long. These branches are called spurs and these spurs gradually increase in size by the addition from season to season of the half-inch branches which bear the fruit buds. Before the leaves fall the fruit buds will be found in the center of

clusters of several leaves, whereas wood buds form at the base of single leaves. Fruit buds may, therefore, be distinguished from wood buds by their location and their size. When sectioned and placed under a microscope differences between wood and fruit buds become noticeable early in the season. These differences become more marked as the season progresses. The growing point of the fruit bud becomes blunt or rounded in shape. Small irregularities appear on the surface of the growing point. Gradually the projecting points of these irregularities take shape, develop rudimentary sepals, petals, stamens, and pistils, showing clearly the floral character of their development. Five or more of these projections develop in each fruit bud, each projection finally developing into a separate flower bud, one of the cluster within the so-called fruit bud. All the flower buds are crowded closely together on the crown of the cluster bud. Wood buds, on the other hand, have a longer axis than flower buds and under a microscope appear to be made up of overlapping scale-like bodies which later develop into leaves.

The difference between wood buds and fruit buds is however less *fundamentally* different than it is *apparently* different. All the floral parts of the fruit buds are made up of modified leaf structures, petals, sepals, stamens, and carpels; all being leaflike in structure when unfolded and their analogies traced.

It is evident, therefore, that the stimulus which causes the growing point of a bud to develop, in one case, leaves, and in another case, flowers, may be a comparatively slight one. Of necessity, then, it must be difficult to discover the immediate cause of differentiation which leads to the formation of a fruit bud.

Most of the studies which have been made with a view to determining the underlying causes of fruit-bud formation have been in the nature of microscopic examinations in which the observer attempted to trace the differentiation from the earliest moment when it became distinguishable, to the time of blossoming the following spring. Goff of Wisconsin and Drinkard of Virginia have been the most careful and patient observers along this line. Beginning in the month of June these men took buds which seemed likely, by their position and size, to develop into fruit buds, at weekly intervals until the following spring. They found that the

first differences between fruit and wood buds appeared during the last week in June and that they were very slight and not easily distinguished until early in July. From this time forward there was a steady progression in the growth of the floral organs which continued until severe winter weather set in. During severe cold weather development remained stationary, but at temperatures above 40° slight changes occurred even during the winter. All the floral organs were complete before winter set in. The spring development before blossoming consisted merely in a rapid growth in size of stamens, carpels, petals, and sepals.

From the studies just referred to we learn that in the apple the fruit buds are formed during the season before the crop which arises from these buds. This leads us, therefore, to a fundamental conclusion in regard to orchard treatment in general; namely that to influence the crop of any one year we must apply our treatments during the preceding year; that differences in the crop must be traced back further than the immediate season when the crop is being produced. Indeed it will be found that influences affecting the formation of fruit buds may extend back over a considerable period and may not of necessity be confined to any one season.

The causes which underlie the formation of fruit buds in apple trees are of two principal types. The first are inherent and the second are external. The inherent causes are those within the nature of the plant itself. The external are those causes which can be brought to bear upon the life of the plant from the outside.

Referring first to the inherent causes, it may be noted that fruit-bud formation is a natural function of the tree. The great fundamental law of all life is the perpetuation of the race. The production of seeds is the means at the disposal of trees by which the race is carried on from generation to generation. The pulp which surrounds the seeds is merely a means to an end. Its appearance and taste attract animals which carry the fruits from place to place and in the course of time bring about a distribution of the seeds. We have, to begin with, therefore, the nature of the plant itself with its determined attempts to produce seeds, and of course in the attempt to do this, the production of fruit buds. Differences between varieties in the number of buds produced are also in-

herent in character. Sometimes reduced productiveness is due to a structural variation between varieties; thus, a long-jointed variety produces fewer buds than short-jointed varieties. Fewer fruit spurs develop; consequently fewer fruit buds are formed and such varieties are usually sparse bearers. This point is well illustrated when one compares the Roxbury Russet with the variety Canada Red. Roxbury has short joints and produces spurs in great quantities. Canada Red, on the other hand, is a long-jointed kind and its rather sparse bearing habit has long prevented it from attaining the degree of popularity in the market which its beautiful appearance and high quality would seem to justify. Even in varieties which do not show marked morphological differences, there are inherent differences which directly affect the formation of fruit buds.

Another example of the effect of inherent causes on fruit-bud formation is to be observed in the relatively different ages at which different varieties come into bearing. Thus, McIntosh, Duchess, Wagener, Pewaukee, and Wealthy bear their first crops, under good conditions of culture and when grafted upon standard stocks, four to five years from planting. Baldwin will bear its first crops at six to eight years from planting, under the same conditions. Northern Spy will not ordinarily produce until at least ten years from planting.

These inherent causes are of the greatest practical importance and yet they are entirely out of our control. All that the orchardist can do is to select those varieties which have proven under test to be productive of fruit buds and which come into bearing at such a time as he prefers. The qualities of variety productiveness and early maturity are born into the variety when the seed from which that particular variety originates is first formed.

While we cannot control the inherent character of our trees we have a large degree of control over external factors which can be made to influence the habits of fruit-bud formation of any particular variety. By withholding food and moisture from trees we can entirely prevent the formation of buds even on the most productive varieties. By good care we can considerably improve the productiveness of those kinds which are naturally sparse producers. The principal external factors influencing the formation of fruit

buds are food supply, climate, accidents of disease, injury, etc., and character of stock and scion.

In the course of his classic experiments with plants, Darwin was led to enunciate the principle that the largest single factor producing variation in plants was food supply. In the formation of fruit buds there is no question that this element enters more largely in one way or another than any other external factor. A consideration of the relationship between food supply and fruit-bud formation must lead the inquirer into asking questions such as these:

How great must be the supply of food available in order to secure sufficient fruit buds to insure a maximum crop? What elements of soil food are chiefly required and in what proportions? Can the tree use an excess of one or more forms of plant food without in one way or another disturbing the function of fruit-bud formation? How may one determine the kind and amounts of plant food that will produce the most desirable results?

These are difficult questions to answer and are by no means fully understood. As a rule, apple trees which have been in bearing for a number of years will form a larger number of more vigorous fruit buds when supplied with additional quantities of nitrogen and phosphorus. Sometimes they will respond to the addition of potassium, though less often than to the addition of other elements. Experience has shown, however, that in very rich soils fruit-bud formation decreases as wood growth increases and we are led to conclude from this fact that it is not difficult to overfertilize apple trees and bring about a condition of vigorous growth with little fruit-bud formation.

I stated a few minutes ago that the addition of limited quantities of nitrogen and phosphorus usually resulted in increasing both the number and the vigor of fruit buds formed. Between the limited quantities of fertilizer which may be applied and which produce this increase in number and vigor of buds and the point at which fertilizers may be applied in such quantities as to cause wood growth at the expense of fruit buds there is a happy medium in which the number of fruit buds is somewhat reduced but in which their vigor is greatly increased. Trees producing a maximum bloom bear many times as many blossoms as are required

to produce the maximum crop of fruit. A good crop from a Baldwin apple tree at 25 or 30 years of age would be from three to four thousand apples. While larger numbers are occasionally produced, the number mentioned is as many as can be developed to the best advantage on trees of this particular age. Such a tree would produce in full bloom about 30 to 50 thousand flowers or 6 to 10 thousand fruit buds. The tree must make a trying effort to produce so large a number of buds and this effort together with the effort necessary to mature the crop usually exhausts its energies to such an extent that comparatively few fruit buds are formed during the year in which the crop is maturing, a condition that results in alternate bearing. Now it would clearly be an advantage to the tree and an aid to regular bearing if we could supply plant food to our trees in such a manner as to strike the happy medium referred to, where the number of fruit buds would be reduced to a point only a little greater than the number of fruits which we want on the tree, while their vigor at the same time would be increased to a point where we would be reasonably certain that a large per cent of the cluster buds would set at least one fruit.

There are men in this audience who will recognize the condition which I have just described. Some of you have had the experience after several years of cultivation or fertilization or perhaps both where you have been disappointed during the blossoming time with the comparatively small amount of bloom which appeared upon your trees but where you have been pleasantly surprised at finding a set of fruit as large as the trees could properly mature and care for. Happy is the man whose trees reach this condition; and happy will he remain if he has the wisdom to maintain them at this point, disturbing them as little as possible by *radical* treatment of any kind while they maintain this particular condition. I shall have more to say a little later in regard to the steps to be taken to bring an orchard into this condition and to keep it there when once it has been reached.

To understand fully the relationship between food supply and fruit-bud formation it is necessary to explain briefly the character of plant food. The plant food which goes to the immediate formation of new tissues, and which is therefore the food involved in differentiation between fruit and wood buds, is quite different from

that absorbed by the roots; in fact it is very similar to the food which nourishes animals. Plants differ from animals in the fact that they manufacture and then use their own food, whereas animals obtain their food already manufactured and have merely to absorb it in order that it may be used for energy and tissue construction. The raw minerals taken from the soil by the roots in the form of solutions are carried to the leaves where, under the action of sunlight and the green coloring matter in the leaves, they unite with carbon dioxide taken from the air and are manufactured into starch, sugars, and other compounds. Under certain conditions they are manufactured into proteids, amides, fats, oils, etc. These manufactured materials are the true foods of the plant tissues. These are transported from the leaves to all parts of the plant through conducting tubes which are found on the inner side of the bark. Upon a plentiful supply of this kind of plant food depends cell division and plant growth. If now there is a large supply of manufactured plant food delivered to the base of the bud; at the season of the year when differentiation between wood and fruit buds should occur, cell division will be stimulated, and we will have a tendency for the bud to develop the projections referred to at the beginning of this address, which projections are the rudiments of the flower buds.

Here we have the explanation why plant food under some conditions stimulates wood growth and under other conditions stimulates fruit-bud formation. When the tree is receiving large quantities of moisture with lots of nitrogen in solution from the soil it will labor hard to produce large numbers of leaves and care for the large quantity of food which it is receiving. Thus, there will be a rapid growth of wood, using up the manufactured plant food as fast as it forms to produce wood tissue and leaves in an effort to keep up with the large supply of plant food coming from the roots. Thus, the tree will, so to speak, postpone the formation of fruit buds until the season for their beginning has passed. On the other hand under too limited a supply of plant food there is not sufficient for the tree to do more than keep itself alive, and there is no reserve of manufactured food which can go to the production of fruit buds.

The food supply may be controlled by the following means:

First, by the liberation of plant food from the soil by means of cultivation or mulching; second, by the addition of fertilizers to the soil; third, by a series of special manipulations of the plant, such as pruning, grafting on slow or rapid growing stocks, girdling, bending branches, ringing, etc. Except in the case of pruning, all these manipulations have to do with the control of the elaborated plant food, and not with the supply from the roots. Further reference will be made to these methods a little later.

A second external factor is that of climate. While it is a well-known fact that fruit buds develop more freely on the apple tree in some climates than in others, we are more interested in the accidental effects of local climatic changes than in the effects of larger differences in climate between different regions. What, for instance, are the effects of wet and dry summers, of severe and mild winters, of frosts which destroy the blossoms in the spring and thus interfere with regular habits of bearing of the trees? It is an old saying, and worthy of some acceptation, that a dry summer in the New England states is productive of a large crop of fruit buds. A careful study of the New England climate leads me to believe that this condition is only indirectly responsible for an increased fruit-bud formation and that over a series of years dry seasons are a disadvantage as they tend to increase the habit of alternate bearing, into which so many of our orchards have fallen. The moisture gathered in the soil during the winter, during the spring rains, and during the month of June, when showers are usually plentiful though not heavy, results in an ideal early season growing condition. The dry weather usually begins near the end of the month of June and continues through July or through August, as the case may be. The dry weather at this time of the year will check the vegetative growth of the trees at the very season when the fruit buds should be forming. The elaborated plant food goes to the proper place at once and we have perfect conditions for fruit-bud formation. These same conditions, however, are somewhat exhaustive on the energies of the tree and the production of a large crop of fruit the next season leaves no chance for the further formation of fruit buds during that season. The same conditions which are brought about by the dry summer can be brought about artificially by the planting of a cover crop in the orchard, the

surplus moisture in the soil being removed, by means of the cover crop, without at the same time depriving the trees of a reasonable quantity of plant food throughout the later part of the season. Therefore, while a dry summer is likely to result in a larger formation of fruit buds, it is not of necessity a desirable condition of affairs, and of course it goes without saying that such apples as are produced during the dry season will be comparatively small and less desirable than in a season of normal but not excessive rainfall.

Accidents of disease and various kinds of injury to trees usually greatly stimulate for a time the production of fruit buds. It is a law of nature that plants suffering from diseases which are slowly fatal will make a strong effort to reproduce themselves before death occurs. In many cases the immediate stimulus cannot be traced. The principal growing tissues, however, respond to the stimulus and often a tremendously increased production of fruit buds occurs. Injuries from borers, from careless workmen in bruising the bark, and from animals pasturing in orchards also result in an increased formation of buds but from a cause which is comparatively easy to discover. The inorganic or raw plant food material taken from the soil is carried to the leaves for elaboration and digestion through the woody tissues in the inside of the tree. The manufactured food returns, as already stated, through conducting tissue on the inside of the bark. Large quantities of the manufactured material return to the roots for storage and for growth of root hairs and of the roots themselves. Borers, animals, and careless workmen may bruise or destroy the outer conducting tissue preventing return of manufactured plant food to the roots, but not interfering with the supply of raw plant food passing upward from the roots within the deep tissues of the branches and trunk of the tree. Consequently there is available for the formation of fruit buds more elaborated plant food than would be the case if the proper quantity could return to the roots These conditions result in the production of an unusual number of fruit buds. If the entire connection between the root and the leaves is severed by such injuries the tree will die at the end of one season. If the connection is only partly destroyed, as is usually the case, growth merely becomes stunted and the vitality of the tree is slowly exhausted.

Fruit-bud formation is considerably affected by the mutual relationship between the stock and the scion. Thus it is stimulated when a rapid growing scion is grafted on a slow growing stock, and under the same conditions it is usually hastened. Thus, apple trees which bear at the age of five or six years, when grafted upon standard stocks, may produce fruit buds one or two years after planting if grafted upon the Paradise stock and two to three years after planting if grafted upon the Doucin stock. Grafting the pear upon the quince hastens its period of maturity. In the former instance fruit-bud formation is stimulated more or less as a result of mechanical interference with the return of the elaborated plant food from the leaves to the roots. As in the case of the injured trees, some of the manufactured food is prevented from returning rapidly to the roots simply because of constriction at the point of union between the stock and scion. There is probably also some inherent reason why standard varieties of apples grafted upon Paradise and Doucin stocks and standard varieties of pears grafted upon quince stocks come into bearing earlier than when grafted upon standard stocks. The mere process of grafting itself results in a certain amount of twisting of the tissues and in a considerable mechanical obstruction which tends to prevent a considerable amount of the elaborated food from passing below the graft.

Having now reviewed in a somewhat elementary way the principles which underlie the formation of fruit buds I want to deal somewhat directly with the effects of various forms of orchard practice on fruit-bud formation. The first of these practices to come to our attention is that of grafting, but as reference has already been made to this practice at some length, I shall barely refer to it at this point. The effects of grafting are to hasten the period of maturity at which fruit-bud formation can be expected to occur, and in many cases to increase the productiveness of the variety under consideration.

The second practice is that of soil cultivation or want of cultivation, and this is a matter of deepest importance to the New England orchardist. Cultivation is expensive in the average New England apple orchard and substitutes for it are continuously being sought and tried. The most common practice in New England has

been to leave the orchards in grass and cut from them as much hay as they would produce. This practice has not led to successful results, but farmers have continually asked the question, "Could they not fertilize their orchards in such a way as to supply both trees and grass with all the plant food needed and thereby overcome the undesirable results which come from robbing the trees by the grass?" Many have tried the plan of cutting the grass in the orchard and allowing it to lie on the ground as a mulch. Others have even supplied extra materials from outside the orchard with which they mulched their trees.

Experiments have now been conducted at a number of experimental stations to compare the results of grass and sod in apple orchards. A series of very carefully conducted experiments at the Woburn Experiment Station in England, extending over a period of fifteen years, indicated that grass is exceedingly detrimental to fruit trees, as compared with cultivation. The experiments involved several different soils and a large number of trees and all sorts of combinations of grass and cultivation. Some trees were planted immediately in land which was sown to grass beside other trees planted in exactly similar soil and maintained under cultivation. The grass-grown trees were very stunted, many of them died, none of them produced fruit until long after the cultivated trees had come into bearing, and then in a small quantity and of poor quality. Some trees were planted in which a circle of grass was allowed to grow next to the tree. Cultivated soil was maintained at the edge of the circle of grass. Other trees were grown in the center of a circle of cultivated soil at the edge of which grass was maintained. Until the roots of the cultivated trees reached the grass circle the trees grew rapidly and were much larger than those grown in the grass circle. Until the roots of the grass-grown trees reached the cultivated circle these trees grew slowly and were very stunted as compared with the trees in the cultivated ground. When the roots reached the cultivated circle, however, outside of the grass circle, then these trees immediately took on new life and grew in a rapid, normal manner. In still another case, trees which had been brought to bearing age and maintained for several years in a cultivated plot were sown to grass and within two years had reached a dying condition and had become entirely nonproductive.

Experiments in the State of New York comparing sod mulch treatment with cultivation showed an immense increase in production in a cultivated plot over a sod plant and an average net profit in the tilled plot over the sod plot of $38.91 per acre, or an increase of 54 per cent in favor of the tilled plot, the extra cost of the tillage having been taken into account in arriving at these figures. At the New Hampshire Agricultural Experiment Station a cultivated plot showed an increase in production over a sod plot, in which neither was fertilized, of about 300%. The average annual production of the tilled plot was three times as great as that of the sod plot, and this does not take into account the fact that the apples in the sod plot were so small as to grade a large percentage of No. 2. On the other hand, excellent results have been obtained under sod conditions by the Ohio and the Pennsylvania Agricultural Experiment Stations where fertilizers were added in the proper quantities. Without attempting to draw a definite conclusion from these somewhat conflicting facts at this point, I will, with your permission, make this conclusion a little later.

Soil moisture as a factor in the formation of fruit buds is of considerable importance. The total quantity of moisture present is of less consequence than its distribution and proper maintenance during the growing season. Under conditions of irrigation where the water supply is properly controlled, and applied at the most advantageous time, apple trees are extremely productive, indicating a very free and regular production of fruit buds. The control of soil moisture in unirrigated sections is a more difficult matter. It is necessary that there shall be sufficient moisture to serve as a conductor of plant food from the soil to the trees. This is particularly desirable in the early part of the season, as we have already seen from the statements in regard to the time at which differentiation between wood and fruit buds takes place. The ideal means of regulating the moisture supply under the conditions which prevail in New England consists in cultivating and cover cropping. By maintaining cultivation from early in May until the first of July sufficient moisture is assured to promote a healthy and vigorous growth of wood and foliage. By stopping cultivation the first week in July and seeding to a cover crop we promote the escape of some moisture by evaporation, and later of more moisture

through transpiration of the cover crop, thus checking growth to a sufficient degree to stimulate fruit-bud formation without checking the supply of plant food to such an extent as to stunt the crop upon the trees. The best substitute for this method of regulating the soil moisture is a heavy mulch of grass or leaves obtained by mowing the hay which grows in the orchard and piling it about the trees or by drawing in material from the outside. Special crops such as rye or hairy vetch may be grown for the direct purpose of obtaining considerable mulching material. In old bearing orchards the material is allowed to lie just where it is cut. It is extremely difficult, however, with this method to obtain a mulch deep enough and thick enough to actually conserve the moisture. Where large quantities of mulching material are grown the mulching crop may be more exhaustive to the soil moisture than would bare ground itself. In rare instances one may have valuable material which can be drawn into the orchard and spread about the trees in such a manner as to form an excellent mulch. To those who insist on planting apple orchards on extremely rocky land or on steep hillsides where cultivation is impracticable, mulching is the only practical means of controlling soil moisture.

Conflicting results have been obtained from the application of fertilizers on the formation of fruit buds. The Pennsylvania and the Massachusetts agricultural experiment stations have obtained favorable results from the application of nitrogen, phosphorus, and potassium. The New York and New Hampshire stations have obtained results which indicate the advantage of fertilizing on the actual total number of fruit buds formed, but their results thus far would seem to show that the increase was not sufficient to justify the expense of fertilizers and their application. In the long run the application of fertilizers or at least of nitrogen and phosphorus on New England soils must of necessity be justified. A Baldwin apple tree which lives up to its possibilities for a period of 50 years will require considerably more nitrogen than exists in the typical New England apple soil, and its productiveness will be limited long before that time for want of this particular element. What is true of nitrogen is true in a somewhat less degree of phosphorus, but the element potassium seems to be present in the soils in this region in sufficient quantities to supply

the apple for hundreds of years to come. The condition, however, frequently exists where in spite of large total quantities of plant food not enough becomes available in one season to supply the needs of the crop for that season. This condition may exist and probably does exist in many soils in relation to phosphorus and potassium, and applications of these elements may result in increased fruit-bud formation. Experience and practice throughout New England indicate that it is advantageous to fertilize apple orchards and where cultivation is not followed it is absolutely necessary to fertilize if any results of value whatever are to be obtained.

No orchard practice so immediately or markedly affects fruit-bud formation as pruning. I almost fear to touch upon this subject because it is one of those subjects which may readily lead to an indefinite discussion and yet leave both speaker and listener feeling that much more had been left unsaid than said. The time of pruning, the age of the tree which is being pruned, the severity of pruning, the method of pruning during past years, the variety upon which we are operating, and other factors enter into a consideration of this subject. Severe pruning during the dormant season stimulates wood growth during the ensuing summer by turning the full current of the root solutions into a comparatively small number of branches. Frequently, too, it brings about a tremendous growth of suckers or waterspouts. A moderate pruning at the same time is likely, if other conditions are favorable, to bring about increased fruit-bud formation simply by thinning out the total number of buds and providing more elaborated plant food for those which remain. A light annual pruning of old trees during the dormant season is on the whole the most practical and satisfactory method of handling the pruning problem. Summer pruning, from time immemorial, has been said to favor the formation of fruit buds but a careful search for facts bearing upon this subject has led me to conclude that this can not be predicted with certainty. The type of summer pruning which seems favorable to the formation of fruit buds consists largely in pinching back the shoots at certain times during the summer. The practice has developed chiefly among the British and European gardeners and largely in connection with dwarfed trees.

When shoots are cut back at exactly the right time fruit-bud formation appears to be stimulated but unfortunately one cannot predict during any one season just when the right time is at hand. Presuming it to be the first week in July, in a normal season, this time will prove too early in a season of heavy rainfall later in the summer and consequently a second or even a third growth of shoots is likely to follow pinching. Many other factors enter at this point to interfere with any exact method. In spite, however, of the fact that summer pruning is more or less difficult to regulate and in spite of the fact that it sometimes gives disappointing results, there can be no question that it is a valuable practice to follow with young trees, particularly if, when they reach bearing age, they are making so vigorous a growth that they fail to come into bearing at the proper time from planting.

The practice of spraying, now so essential in all well-managed profitable orchards, may have an effect on fruit-bud formation. For the most part this effect is indirect. Where the foliage of the tree is free from disease and insect injury it may fulfil its functions much more completely than where it is attacked by scab and leaf-spot fungi or eaten by brown-tail moths, gypsy moths, and tent caterpillars. It goes without saying, therefore, that ordinary spraying treatment is advantageous to the formation of fruit buds. Under certain conditions sprays sometimes injure foliage and where this occurs they become a menace rather than an aid; and it behooves the orchardist to be on the watch to guard against injurious spray mixtures if he finds severe injury to his foliage resulting from their application. The Ohio Agricultural Experiment Station recently found that there was a much better formation of fruit buds in a plot sprayed in 1910 with lime sulphur mixture than in a corresponding plot which was sprayed with Bordeaux mixture. A similar condition was observed this year in one of our experimental orchards in the western part of the State of Illinois. I have not observed such conditions in New England and I doubt if they occur in this climate to so great an extent as farther west. These facts indicate, however, that the orchard practice of spraying must be under constant observation if we are to obtain the best results from it, not only in the protection of the crop upon the trees but in the buds which are to give us the ensuing crop.

A consideration of the principles which underlie the formation of fruit buds and a study of the effects of common orchard practices have led me to believe that to insure a regular and free supply of fruit buds in apple orchards it is necessary to preserve a nice balance between food supply and working area of foliage. This balance may be destroyed by ill treatment or neglect, in which case the food supply falls far below the requirements of the tree; or by good treatment applied too suddenly, in which case the balance between root and foliage, or food supply and working area, is destroyed in the opposite direction. This latter condition will almost certainly result where old trees are suddenly brought under cultivation and are heavily pruned and fertilized. To prevent this condition from occurring it is well to bring trees under improved conditions somewhat gradually, beginning with a moderate to comparatively severe pruning the first year, doing a little more pruning and adding cultivation the second year, or perhaps fertilization in place of cultivation if the owner prefers, and finally in a third season, adding the last of these three treatments, either fertilization or cultivation as the case may be. To maintain this balance when once it has been obtained no better rule can be given than the advice of St. Paul the Divine, "Be ye temperate in all things." Fertilize in moderation and stop fertilizing at the first indication of too much wood growth and too few blossoms. Do not continue cultivation too late in the season but begin early. By this I mean that cultivation should not be continued from the beginning of the season until August or September, but that it should stop about the first of July. The process of cultivation itself should however be done thoroughly and not in a slipshod manner.

Let pruning be done with equal moderation, but with religious regularity. Under no circumstances miss a single season. If you do you will certainly pay for it in the ensuing year when comparatively large quantities of the wood must be removed and the balance of food supply and leaf area must of necessity be more or less disturbed.

ADAPTATION OF LOCAL GROWN SEED TO LOCAL CONDITIONS.

By Dr. Will W. Tracy, Washington, D. C.

Delivered before the Society, February 8, 1913.

In December of 1907 I had the honor of addressing your society and I talked at that time about the great number of varietal names of cultivated vegetables, as compared with the comparatively limited range of distinct varietal differences which the names really stood for, and of the great importance to profitable cultivation of the use of seed each one of which was uniformly of the exact varietal character desired. During the five years since that talk I have had opportunity to see hundreds of cultures of vegetables and to learn of the comparatively greater satisfaction and profit that come from the use of seed which was not only uniform but of the exact character best adapted to each particular culture and economic use; and because of this experience I am very glad of the opportunity to talk to you today about the adaptation of strains of cultivated vegetables to local conditions and special requirements.

In the case of most cultivated plants, and particularly those most generally used as culinary vegetables, there are indefinite and indescribable differences in stocks or strains of plants called by the same varietal name through which they are more or less perfectly adapted to local conditions of soil and climate, and still more so to distinct market conditions or culinary uses.

The basic purpose of all horticulture is the direction and control of the character of vegetable growth rather than a mean increase in its volume. Cultivated fields do not generally carry a greater

burden of vegetation than the wild forest or prairie, but under cultivation the productive energy of soil and sun is directed towards the development of the particular kind of plant which is most desirable. In the case of most fruits this can be easily secured by multiplications of vegetative parts of the original plant, but as most garden vegetables are propagated by seed, uniformity of crop can only be secured through the use of seed, every grain of which, because of hereditary tendency, will under cultivation develop into a plant of the desired varietal form well suited to some specific condition and use.

Such varietal character of seeds is seldom indicated by any observable difference in the seed itself, but is like that between two apples from the same tree which are indistinguishable by the eye or the scales, but differ most materially in flavor or keeping quality, or like that between two turnips or two tomatoes from the same plant which may be so alike that they cannot be distinguished by eye or scales, and yet differ most materially in palatability. In like way seeds produced by plants of the same heredity, but grown under different climatic or soil conditions, will often carry a materially different tendency and potentiality of development, and even in environment as identical in character as it is possible to secure will develop into plants showing very distinct varietal differences. Different plants vary greatly as to the degree and in the way they show such inherited tendencies.

We all know in the case of corn the growing for even a single generation in a more northern climate or during an exceptionally cold season will result in the shortening of the time it will require for plants from such seed to develop from germination to ripened grain, and that the corn plant will through its seed adjust subsequent generations to the climatic conditions where it is grown. On the other hand, I have known a five-acre field in Michigan to be planted in equal parts with two lots of watermelon seed, both originally of the same stock but one of them grown for the five preceding seasons within one hundred miles of the Gulf of Mexico, and the other for the same number of generations in Michigan, with the agreement that if the grower could detect any material difference in the earliness of maturity of the lot grown from the Michigan seed he was to have a bonus of $100.00. The outcome

was one of the finest and most evenly ripening field of melons I ever saw, and the grower made no claim for the bonus.

I have had opportunity to observe a great many similar comparisons of crops from northern and southern grown seed of the same varieties of cucurbitaceous plants without being able to detect any differences in time of maturity but have known of instances where there was clearly a material difference in other qualities that seemed to have resulted from environmental conditions of the seed producing plants, and the most successful southern melon growers are careful to use only southern grown seed.

I might take up the whole afternoon in discussing the adaptation of plants through their seed to environmental conditions, and such adaptation is not limited to cultivated plants. I well remember an experience of fifty years ago when I found growing in the open cracks in limestone ledges in Northern New York very pretty little geranium-like plants which seemed quite different from any I remembered having ever seen before, but after a careful botanical examination I could find no difference except much smaller size and deeper, brighter color of the flower between the new plant I had discovered and the common wild geranium, or cranesbill, *Geranium maculatum*, which grew everywhere in Michigan. I saved and took home some of the seed from my dainty little plants and grew it for three generations in Michigan where it became the comparatively coarse and unattractive wild geranium.

I would refer to scores of similar experiences all showing that at least some of both wild and cultivated plants are capable within a few generations of readjusting themselves to changed conditions and environment. A careful observer cannot have failed to notice the material difference often seen in the character of plants of the same species, and even of the same garden variety, when grown on different soils and exposures, and that one plant will reach its most attractive and useful development where another, possibly of the same species, and even supposedly of the same variety, will develop but poorly.

I think it needs no further discussion to show that in order to secure the most satisfactory results in quantity and form, we must plant seed which is not only uniformly of the varietal forms which will be most satisfactory but which has been so grown as to be

the most perfectly adapted to that particular climate and soil, and for the particular use for which it was planted. We think this not universally practiced by even our most careful planters. Growers from Maine to Florida depend upon California for their lettuce seed. The Boston grower who forces a crop in midwinter uses seed grown in the same California fields as that used by a Norfolk or Florida planter for an outdoor crop. If the variety and the stock was the best possible for use in one set of conditions it can hardly be the best possible for the other. We have found that by growing lettuce seed under glass we were enabled to select and breed from plants which did much better inside than otherwise equally good and carefully selected plants grown in the open. We think that the success of such growers as the Hittinger Brothers of your city and Dell Titus of Irondequoit is very largely due to their use of strains of seed especially adapted to their local conditions and cultural practice, and that an interchange of seed would mean comparative failure to both.

The first success of the melon growers at Rocky Ford was very largely due to the use of carefully selected and *local grown* seed especially adapted to their location, cultural methods, and last but not least, shipping requirements. Nearly twenty years ago I visited a melon field in Rocky Ford with Col. Swink, the father of the melon industry in that section, and asked him to select for me ideal specimens, which he did taking great care to select fruits very uniformly of a certain distinct character; then a little later when he very carefully selected some fruits to take home to eat I called his attention to how different these were from the first selection, and he said the first fruit was the best for shipping and good enough to sell, but not such as he wanted for his own table. The Montreal melon is very different in character and is grown and handled very differently, but the growers, like those of Rocky Ford, use local grown seed carefully tried and selected so as to secure the best possible adaptation to local conditions and requirements.

No two farms are exactly alike in climate and productive energies, no two men will follow identical cultural methods, and the varietal character of a vegetable which will give the best satisfaction and profit on one farm and for one market will not be as satisfactory in another, so that the best possible results can only come

from the use of seed from which it is possible for you to produce a superlative quality, at least of those vegetables upon which your reputation and profit chiefly depend.

How can such seed be secured? I have had an intimate connection with American seedsmen for over thirty years and I believe them to be quite as honorable and considerate of their customers' needs as any class of merchants, but they are in business for the sake of personal profit rather than from altruistic motives, and cannot be expected to push the sale, or to long continue to offer varieties or special stocks which afford them little or no profit. Often a certain variety can be depended upon to give a good yield of seed in one location, but rarely more than a very light crop in another, although what seed you do get is apt (not certain) to yield large crop of better quality in the second location than seed from the location which gives the larger seed crop. Can you expect the seedsman to persistently grow his seed in a location where the crop is apt to be a failure or to push the sale or long continue to offer a stock which affords him no profit? I have known of many instances where a variety or special stock materially better than that generally used has never come into the general planter's hands and has dropped out of cultivation because the seedsmen could not handle it with profit. Again, could a seedsman be expected to furnish distinct stocks of common sorts so grown as to be especially adapted to the conditions and wants of each of thousands of customers, many of those using only one ounce or two of seed? One has no right to criticise common practice without suggestion for betterment and so I make bold even here in Horticultural Hall, and before this society made up of the wisest and most skilful horticulturists in the United States, to make the following suggestions for the securing strains of seed of the vegetables of which the quality is of the greatest importance to you and will give the greatest satisfaction and profit.

First, form a very definite, clear, and exact conception of the exact varietal form you want, and that you may do this intelligently it is advantageous, almost a necessity, to make or at least see and carefully study growing tests made in climatic soil and cultural conditions that you can reproduce as closely as possible in your own cultures of as many varieties and stocks of the vegetables

you are specially interested in as possible. Such trials should nclude as many as practical of the special stocks and so-called novelties of seedsmen. It is probable that such a test will demonstrate that most of the claimed superlatives are useless to you, but if one lot does some better than anything you have previously used, and you are thus guided and helped to the developing a stock which is the best possible for your conditions, this discovery will be worth more than your trials for a dozen years would cost.

When you are sure as to the exact varietal form which will be most satisfactory and profitable, I think it is very desirable if not absolutely essential, that a description of it be written out and, if possible, illustrated by drawing or photographs made and be frequently referred to in order to avoid the indefiniteness and change in conception of the exact form selected, which is the root of much of the variability so common in most stocks.

The second is to select a score or more plants each of which comes as near to this ideal as possible, avoiding the temptation to include even superlative plants that differ in any way from the recorded ideal sought for. When the habit of growth is such as to make it practical to do this, each of these selected plants should be screened so as to insure its self fertilization, and in any case, the seed of each plant, even of those which are so near alike as to be indistinguishable, should be saved separately.

The third step is to make a growing test of a generous sample of each lot of seed under uniform conditions of soil and culture. As the plants develop they should be carefully studied and the lot in which the plants are most evenly like our ideal of the sort should be selected, resisting the temptation to take lots which may contain superlative plants, but also many inferior ones or those which differ in any particular from our described ideal. In order to guard against a concealed variant, and the mishaps to which all such selections are subject, it is wise to select one or more second-choice plants as substitutes.

The fourth step is to plant the reserved seed of the plant or plants which our trial has proved to be the most uniformly like our ideal, each as completely separated and protected from the chance of contamination through the pollen from other plants as it is possible to secure, and carefully save the seed so grown as founda-

tion stock to be planted in an isolated block, from the product of which we may develop any desired quantities of stock seed.

If our selection was as good as our sample trials indicated, and we have in it a plant of the exact form desired which did not carry a hidden tendency to variations, recessive in our test samples, but developed in later generations, our work is accomplished; but human control of conditions is imperfect, and it is quite possible that our selected foundation plant did carry a hidden variant which may crop out in some future generations and reveal the want of uniformity. In which case we simply have to try again, and in any case it is wise to start a new selection from our very first full seed crop in order to guard against the effect of the inevitable crossing in future generations.

I do not think it would be profitable or advantageous for one to attempt to grow all the various seed he uses, but I do think that very often it would be an advantage for a grower, or better yet for a local group of growers to grow what seed they need of one or more of the crops which are adapted to their location, and to which they pay special attention, and I am certain that if the work is wisely and carefully done along the lines suggested it would give them seed which, because of its adaptation to their conditions, would give them crops better in quality and quantity than it would be possible to produce from seed grown elsewhere.

LANDSCAPE ARRANGEMENT OF PUBLIC PARKS AND PRIVATE GROUNDS.

By Arthur A. Shurtleff, Boston.

Delivered before the Society, with stereopticon illustrations, February 15, 1913.

A public park or private estate should be accessible readily by road and rail not only to those who are to frequent the land for pleasure purposes, but also to those who are to furnish labor and material. The public will not visit a park which is inconveniently situated; a half-mile walk or a five-cent fare cannot be exceeded without grave danger that, as the novelty of the park wears off, pleasure seekers will forsake its precincts altogether. Although the choice of a private estate is involved to a less degree by considerations of distance from the city, the owner must carefully weigh this factor to determine how many hours of his life and how much of his income he will devote to mere travelling. The transportation and cost of labor and of materials are also to be reckoned with as a large item both in the first period of construction and in the final budgets of up-keep.

Breezy northern slopes are desirable for grounds which are to be used only in summer, but for winter enjoyment southern slopes and protection from the wind are essential. In cold weather furnaces and artificial light cannot bring cheer to a building placed on a site deficient in sunlight and unduly exposed to the wind. Likewise, electric fans and awnings are poor makeshifts for the breezes and the shade of trees which afford natural relief from summer heat. The slope of the grounds should not be so steep

or so wanting in contour as to prevent the construction of roads of moderate gradient between points of strategic importance. These gradients should be tested carefully with an instrument not only to learn their steepness, but to make possible the preparation of a general working plan for pleasure and service roads.

The grounds should be carefully examined to discover the presence of rock. If ledge occurs where roads are to be built or cellars excavated, serious items of expense will be involved. The cost of removing ledge is from ten to twenty times that of ordinary earth excavation. Outcrops of ledge which furnish stone for buildings or road foundations, or which add picturesqueness to the landscape are to be highly prized.

Boundary lines should be free from jogs and offsets, and should embrace all land needed for the development of immediate landscapes, and for the control of distant outlooks. Park margins should be carefully adjusted to the contour of the ground in order to permit the construction of boundary roads of moderate gradient. Such marginal roads not only assist in policing the park, but they ensure the orderly development of adjoining private property by forcing the nearest buildings to face, rather than to back upon the public land.

The nature of the soil should be studied both upon the surface and at a depth (by means of test pits dug for the purpose) to ascertain its water holding capacity and the size of its aggregate. A sandy or gravelly quality is very precious because it renders possible cheap roads, cheap concrete, dry cellars, and ready sewerage disposal, although on the other hand, grass and trees may suffer for lack of water in such ground. A heavy clay soil may be endured for its economic uses and for the good grass which it generally produces. The top soil or loam should be deep and a liberal supply of yellow loam should lie beneath it. This combination with adequate rainfall furnishes the mainstay of all vegetation. Light cultivation under such conditions will bring good soil speedily into bearing, but heavy cultivation extending over a period of years is often required to bring a thin soil into a productive condition. A liberal water supply must be obtainable within easy pumping distance of the building sites and the young plantations. For ordinary economic uses, water should be free from hardness to

ensure ready solution of plant food and saponification. Drinking water should also be free from organic matter.

Land for a public park or private estate should be chosen with consideration of the appearance as well as the condition of its woodlands, meadows, brooks, ponds, and fields. These features are the materials of scenery, and they must compose or be capable of composition into landscapes pleasing to the eye. If the land of your choice fulfils all severely practical requirements, and at the same time possesses fine landscapes, your search has been well rewarded, and you may undertake problems of design and construction with the assurance that no unforeseen topographical difficulties can thwart you. Problems of design are difficult in themselves, and they need for their best solution all the initial assistance which topography, soil exposure, and landscape can provide. Design should aim to render the territory highly convenient and useful for the special purposes of the park or private estate with the least first cost and with the least cost of maintenance. Good design would miss its aim did it not preserve and create appropriate and attractive landscapes, landscapes in which roads, buildings, fields, woodlands, water, bridges, and all other elements enter without affectation to form compositions pleasing to the mind and to the eye.

THE DISEASES OF THE VIOLET.

By Dr. Donald Reddick, Ithaca, N. Y.

Delivered before the Society, March 1, 1913.

The John Lewis Russell Lecture.

The Host.

As with most other plants brought under cultivation the violet either has brought with it or has become subject to some very serious fungous parasites. Some of the spot diseases of the violet are fairly common in the wild but have come into prominence only as the violet has become of commercial importance. Other more obscure or inconspicuous diseases, as for example the root disease, have either escaped attention entirely or have been a later development. In any case it is certain that fungous parasites do not have the opportunity to become widespread and destructive in the wild that they do with the artificial conditions under which they are propagated in glass houses. There is no opportunity for natural selection of strong or resistant plants by the survival of the fittest that occurs in nature when propagation is done by the violet culturist. As a result we see certain diseases becoming of more and more importance under present intensive methods of propagation while one at least has become very serious indeed.

To fully understand the peculiar importance of the relation of cultural conditions to the diseases under consideration some knowledge of the way in which violets are propagated and grown commercially is necessary.

Violet Culture.

In commercial violet culture the grower is busy at all times in the year. Almost daily there are operations which have a direct bearing upon the occurrence and the severity of disease.

Cuttings. At the present time the violet is propagated almost exclusively by means of cuttings. These cuttings are taken from apparently healthy plants in the beds shortly after the warm weather of spring. The strong terminal tips are cut to 4 or 5 buds, the larger leaves are removed with a sharp knife, whereupon the cutting is dropped into a pail of fresh water. The preparation of cuttings is almost invariably done by women and children, oftentimes at home in the evening. When a sufficient quantity of the cuttings is accumulated they are stuck into moist sand at a distance of an inch apart and in rows approximately 2 inches apart. The sand is then wet down very thoroughly. The sand for this purpose is obtained fresh each year from the sand pit and practically no grower ever considers using the sand in his cutting beds a second time. If conditions there are maintained satisfactory a large percentage of the cuttings may strike roots within a few weeks.

Preparation of the soil. In the meantime the old plants in the houses along with soil to the depth of 6, 8, or 10 inches have been removed. New soil or soil which has grown some other crop for three or four years is drawn in. To this a large but varying amount of manure is added and very thoroughly mixed with the soil in the beds by repeated turning over with the fork. Plants are taken from the sand sorted into firsts and seconds and the beds set with firsts, the popular distance of planting being 9 x 9 inches. A certain amount of the seconds is placed between the other plants to be used as reserves in case any plants die.

Cultivation. When the plants have become established in the soil they are cultivated from week to week with a tool commonly known as a five finger. Great care is used in watering and ventilating. Many growers think the secret of their success lies in careful attention to these two details although, as a matter of fact, one can often find two successful growers who employ quite different methods in this respect. Cultivation continues until it is time to permit the runners to spread over the intervening space. By

autumn the entire surface of the soil is covered with a mat of interwoven runners and this matting increases as the season progresses.

Temperature relations. The temperature most favorable for violet culture lies between 35 and 45° Fahrenheit. When the warm spring days arrive the plants begin to decline and the returns are no longer profitable. It is to be noticed that the plants are grown in a very rich soil, that the houses are kept covered with a coat of lime to reduce the amount of light, and that the plants require a large amount of water. These conditions resemble quite closely the conditions under which the violet plant grows naturally. The point, however, which most growers do not seem to bear in mind is the fact that the violet in the wild usually grows in open woods where the roots of trees and shrubs take away great quantities of moisture.

The Thielavia Root Rot.

Names applied to the disease. While there are a number of diseases of the violet, some of which I shall discuss a little later, the one of greatest importance at the present time is, without question, the so-called root rot disease. Indeed with growers of violets in New York State the importance of this disease so greatly overshadows any others that it is often spoken of as "the violet disease." Many of our growers refer to it as black rot; others as black root or root rot.

Although the violet is the host plant in which we are particularly concerned today it is to be noted that this disease is not confined to the violet alone, as is so often the case with diseases in plants, but occurs on a wide range of hosts; almost every year seeing an increase in the list of host plants.

Some of the most important floristic plants upon which the disease has been reported to occur are violets, sweet peas, also field peas, cyclamen, and asters. The disease has received most attention, however, on account of its ravages on the roots of tobacco both in Europe and America.

History of the disease. Professor Roland Thaxter (1892) [1] first discovered this disease on the roots of violets. This also is the first

[1] Dates refer to a bibliography at the end of this paper.

record of the occurrence of the disease in this country and is among the earlier records of the occurrence of the disease anywhere as such. Long ago Berkeley and Broome (1850) discovered the disease on the stems of field peas but make little mention of the disease itself, the greater part of their article having to do with the organism found associated. Sorauer (1895) recorded definite injury to the roots of cyclamen. The first contribution dealing with the nature and cause of this disease as it occurs on the tobacco is that of Peglion (1897). Since then the disease has received considerable attention on account of its occurrence on tobacco, the more recent contributors being Selby (1904), Clinton (1907), and Gilbert (1909).

Had the writer not overlooked, until very recently, the work of Foex (1910), he would have been saved considerable labor as the disease as it occurs on the violet is very well treated in this contribution.

Geographical distribution. Where the disease may have first occurred remains in doubt. It was certainly present in England in 1850, in Germany in 1876, and in the United States in 1891. How many years it may have existed in all of these countries previous to the date of discovery is problematic. From the very nature of the disease one might be led to believe that it has existed for an indefinite period but simply has been unobserved. There is no evidence whatever to indicate that this is a disease that has been brought to us from another country.

Economic importance. One should not infer, from what has just been said, that the disease is of little economic importance for this is not at all the case. It is almost invariably true when any plant is brought under cultivation and is grown under conditions different from those under which it occurs in the wild that diseases of little importance under natural conditions become of considerable importance. In the case of the violet, for example, the losses from this disease are frequently very great, but, in its milder form frequently is not recognized as a disease at all and losses occur without causing any particular comment. There is, of course, no way of making estimates of such losses nor indeed is there any satisfactory way of estimating losses from severe injury except in cases where the whole planting is destroyed. It may be said then that the

toll is sometimes rather small, at other times much larger, while occasionally the whole house may be lost.

Symptoms. Plants attacked by the Thielavia disease in its various stages are readily detected. A great many growers, however, do not realize that the various symptoms which I shall now present to you are symptoms of one and the same disease. Indeed, one often has considerable difficulty in convincing growers that this is true. The most striking symptom of the disease as it occurs on the matured plant is a yellow appearance and the somewhat dwarfed and crinkled condition of the foliage. The foliage is not as abundant and the yellow cast is particularly noticeable in contrast with the deep green of healthy plants. On making a more careful examination the underground stem will often be found to be badly diseased. It may be cracked and rough or if in very damp soil often appears water-soaked and black in spots. Definite brown or black lesions occur on the roots usually girdling them and stand out sharply in contrast with the normal white color. The roots may be girdled at many points. The disease also occurs on the runners and leaf petioles where very characteristic lesions are produced. When young the lesion is a small water-soaked spot but as it increases in size the center becomes whitish and the margin black. Sometimes the runners are entirely girdled, but there is a tendency for the lesion to extend more in a longitudinal direction than radially.

Etiology.

Identity. When Berkeley and Broome found the disease on the stems of peas they were uncertain whether the fungus they found there was the cause of the disease or not. At any rate they were primarily interested in the fungus which they found to be an undescribed species and which they called *Torula basicola.* Zopf (1876), also interested in systematic mycology, found a fungus in Germany which had several stages in its life cycle, among them the stage described by Berkeley and Broome. Following the adopted system of nomenclature he called the fungus *Thielavia basicola.* The proof that the fungus which was found associated with the various lesions of this disease was really the cause of the disease came much later. Indeed, many persons have found considerable

difficulty in settling this point conclusively. In many of the experiments performed the fungus has been placed in contact with various plants and has failed to produce any definite lesions.

Morphology. *Thielavia basicola* has in recent years received considerable attention in many different localities and there are now a number of excellent descriptions and illustrations of the various stages of this fungus. It will not be necessary, therefore, to enter into a detailed description of these further than to point out the essential spore forms. The form with which one most frequently meets and which is very characteristic is the chlamydospore. Compared with most fungous spores this body is unusually large, so large indeed that one can nearly see it with a high-power hand lens. It is composed of several segments (4 to 8) each segment of which is larger than the spores of many fungi. Two or more of the segments near the base of the spore are usually without contents and are therefore nearly colorless. The remaining segments, however, are dark brown in color and have a thick wall. Mature chlamydospores break up readily into segments, each of which, under favorable conditions, may germinate and grow into a new plant.

The germination of the segments is by means of a single tube which is pushed forth and gradually elongates by growth at the tip. The germ tube as it increases in length also becomes branched and soon develops into a small fungus weft known as a mycelium. From this mycelium new chlamydospores develop in the course of time.

In addition to the chlamydospores, however, there are formed on the new growth spore generating tubes from which are developed the endoconidia. These are small cylindrical bodies with thin walls. They are produced in abundance in the mycelial tube and issue from its open tip in long loose chains. The endoconidia may germinate as soon as they are pushed forth from the tube the germination being by a single germ tube. In the case of chlamydospores a considerable rest period is necessary before germination can be effected.

These two spore forms of the fungus are not at all uncommon but a third form first found by Zopf (1876) and the form from which the fungus is named does not occur so abundantly. In this stage

a globose fruiting body visible to the naked eye is developed. Inside this body numerous sacs or asci develop and within them are contained 8 spindle-shaped ascospores. The recent article by Foex is accompanied by a fairly satisfactory illustration of this stage of the fungus, showing the occurrence of the fruit body within the host cells.

Life History of the Parasite.

Pathogenicity. In the spring of 1910 the writer had occasion to give this disease of violets considerable attention in coöperation with the Rhinebeck Violet Growers' Mutual Protective Association. Considerable difficulty was experienced in determining the exact cause of their trouble. The lesions on roots and stems were abundant and the mycelium of a fungus could be found in these lesions. However, no fruiting bodies or spores of any kind could be found at that time so it was impossible to identify the organism. Considerable quantities of material were brought to the laboratory for study and numerous attempts made to isolate the organism by the ordinary bacteriological methods. A black-appearing fungus having the fructification of an Acrostalagmus was isolated. This was tested to determine whether it had the power of causing disease. All attempts failed. In the meantime another fungus producing enormous quantities of black-colored spores was isolated and also tested with negative results.

However, some other diseased plants were removed from the soil and an examination made with a microscope. On these plants abundant chlamydospores of Thielavia were found. A dilution plate culture was made and numerous segments of chlamydospores located in the culture medium by means of the microscope. In a few hours germ tubes from these segments began to appear and in a few days it was possible to pick out the "colony" of mycelium which had developed. These colonies were transferred to tubes of a sterile medium in which great quantities of chlamydospores and endoconidia were soon produced. No difficulty whatever was experienced in obtaining cultures when proper spore material was available for the work. The culture medium used was a potato broth thickened with agar.

On September 13, 1912, quantities of spores were removed from culture to an atomizer containing sterile water. Five violet plants in the greenhouse were wet down thoroughly with water and then sprayed with this suspension of spores. The plants were covered over night with a bell glass. Ten days later typical lesions of black rot were found on a few runners and a few days later 4 of the 5 plants showed a number of lesions of the disease. On November 24, 1912, three lots of 21 plants each in the benches were sprayed respectively with pure cultures of *Thielavia basicola* isolated from violet, ginseng, and from tobacco. The plants were thoroughly moistened with tap water before inoculation was made and the bed then covered with waxed paper for a period of 24 hours. At the same time inoculations were made spores were placed on glass slides in moist chambers to determine the percentage of germination. For some reason or other few of the spores were in viable condition although a test two days earlier gave a high percentage of germination. It was not surprising, therefore, that an abundant infection was not obtained in this last experiment. However, a good many spots appeared on the plants in all of the plats, certainly sufficient to prove without a question that the ginseng and tobacco organism is identical with the one from violets. An untreated lot of 21 plants in the immediate vicinity remained free from infection. In this case the period of incubation was 12 days but many more spots were evident after a period of 14 days. From some of these lesions the Thielavia was again isolated, this time with no difficulty whatever.

Physiology. Attempts were made to determine exactly how the germ tube of the spore gained entrance to the host tissue. This matter was given very careful attention but the exact method of penetration was not determined. It is quite probable that the germ tube goes directly through the walls of the cortical cells. At any rate one can find on making microscopic examinations that the mycelium of the fungus readily penetrates the cell walls. The minute holes through which it passes from one cell to another are easily detected. The fungus may grow either within or between the cells. The cell contents are quickly plasmolized and soon entirely absorbed by the fungus, while cells can be found which are completely filled with the mycelium. The mycelium

is light colored when young and variable in size; as it grows older it becomes a darker color while the old mycelium is nearly black.

Incubation. It will be recalled that in the inoculations recorded above it was at least 10 days after the inoculation before any lesions appeared. During this period of 10 days the fungus was making headway in the plant cells but had not killed a sufficient number to make the lesions evident to the naked eye. When the lesion first appears it may be a very small spot. From week to week it increases in size, as the fungus gradually spreads in all directions and kills new tissue. Eventually the fungus may spread through the stem killing all of the cells in which case the root, stem, or leaf beyond that point dies.

Resting stage. The ascosporic stage of the fungus, mentioned above, does not seem to play a particularly important rôle in the life cycle of this organism. If it were commonly developed it would seem reasonably certain that the numerous workers in this country and abroad would have seen and recorded its occurrence more frequently. This stage is often the important one in tiding a fungus over the winter or other adverse circumstances. In the case of *Thielavia basicola*, however, the chlamydospores perform this function admirably. It will be remembered that they do not germinate immediately on formation and there is every reason to believe they normally function as hold-over bodies. The endoconidia on the other hand are short-lived. They are produced in great quantities and provide for a widespread distribution of the fungus during favorable periods.

Propagation stage. Shortly after the lesions became apparent on the inoculated plants examination with the microscope revealed the fact that certain mycelial threads had pushed to the surface and that there were developed on the stem both endoconidia and chlamydospores. The writer was, therefore, surprised a little later to find that chlamydospores were also produced within the cells of the host plant. Further examination revealed the fact that they occur there very commonly indeed. It was then noticed for the first time that Dr. Thaxter had already mentioned this peculiarity in his contribution in 1891. Careful sections were made to determine the location of chlamydospores with respect to the various tissues, when it was found that they might be formed in

any of the cells of a stem or root even including the ducts or sap-conducting vessels. The occurrence of these bodies within the cell of the plant indicates further their function as resting bodies. They could only be liberated and produce infection in new plants with disintegration of the tissue in which they occur.

It has been found that the persons making violet cuttings rarely know that the lesions on the stems bear relation to the violet disease, therefore cuttings which have only very small lesions on them are invariably placed in the soil along with healthy ones. More than that they fall into the same pail of water with healthy cuttings and thus abundant opportunity is afforded for distributing endoconidia to many plants. That this distribution does occur not infrequently was plainly apparent when some observations were made at the time of taking the plants from the sand. In a number of cases the writer counted the young plants actually thrown out on account of this trouble and found frequently as high as 40% of the plants grown from cuttings infected. For the most part infected plants are easily detected as they come from the sand. The lesion which was very small at the time the cutting went into the sand increases in size and the stem becomes black. Sometimes only a black point is evident. There are indications that the black-pointed plants are ones which become infected from diseased cuttings. Not infrequently many of the new roots also are infected. These are discarded but even the most careful grower will not succeed in sorting out all of the infected plants. A certain number invariably get into the soil. Some of them die after a period of time but the slightly infected ones may live through the year. The cultivation that is done during the summer naturally drags occasional diseased roots to the surface and later, the runners when they spread over the ground, become infected. Furthermore the old roots of the previous year are never entirely removed in changing the soil so that as they slowly disintegrate quantities of chlamydospores from the previous year are set free. The propagation of the fungus from one year to another is therefore usually in one or the other of these ways and is doubly assured.

CONTROL.

Sanitation. With the above points in mind the method of control may now be approached from a scientific standpoint. It seems very evident that only perfectly healthy cuttings should be used in propagating violets. This may seem a simple proposition but it always must be remembered that some of the cuttings which are apparently free from disease may have the fungus in them in the incubation stage. The sand used for rooting the cuttings should, of course, be free from rotten roots of previous years. Many growers make a regular practice of bringing in new sand, but the old sand will prove perfectly satisfactory for this purpose providing it is sterilized. Commercial formaldehyde is effective when diluted at the rate of 1 pint to 12½ gallons of water. This solution should then be sprinkled over the cutting beds at the rate of 1 gallon per square foot of surface. The treated bed should be covered for 12 hours or more with burlap or oil cloth. Cuttings cannot be placed in the sand until the formaldehyde has evaporated. Evaporation may be facilitated by frequent stirring.

Great care should be exercised in culling out any affected plants, discarding those showing lesions on the stem, black point or black bands on the roots.

Protection to cuttings. The possibility of spreading infection at the time of making the cuttings and when sorting out diseased plants is very great. There should be some method of protecting healthy cuttings or plants by dipping them in a fungicide. The difficulties experienced by the writer in making such treatments, however, lay in the fact that violets, particularly the cuttings, are very sensitive to chemicals. Bordeaux mixture and formaldehyde at various strengths were tried but the number of plants killed was too great to warrant practical application of the method. Further tests are contemplated.

Disinfection of soil. A thorough disinfection of all soil in the houses should then be effected. The grower attempts to do this in a practical way by changing his soil from year to year. This is a laborious and ofttimes a costly process but yet practically necessary on account of disease. Many growers would like to use their soil at least two years if it were not for the occurrence of this

disease. Soil is disinfected easily with steam but most violet houses are heated with hot water so that steam sterilization is impracticable. With this in mind the writer has undertaken to disinfect the soil in violet houses by means of the formaldehyde treatment. Just how satisfactory this treatment will be remains yet to be seen. Theoretically it should prove satisfactory, but quite often theory does not work out in practice.

A particular case in point is apparent in my trials to control the disease by the method employed in keeping the disease under control in the tobacco fields in Connecticut, namely, by acidifying the soil with acid phosphate. Our experience so far in this treatment has not proved satisfactory. Acid phosphate used on the soil in the proportions usually advised for tobacco fields has not held the disease in check. Furthermore, when perfectly healthy plants were placed in sterilized soil, to which the usual quantity of acid phosphate had been added, they gave an unsatisfactory growth as compared with soil treated in the usual way.

Fortunately not many violet growers have begun the use of lime. An alkaline soil is shown definitely by Briggs (1908) to favor the development of Thielavia and its extensive use in the violet house would doubtless tend to increase the amount of disease. Some growers use wood ashes as a fertilizer to a certain extent and for that reason a test plat treated with wood ashes was included in the following experiment.

Control experiments. An experiment was designed to test the effect of acid and alkaline fertilizers on the amount of disease developing in affected plants. The experiment is imperfect and incomplete in certain respects but a number of interesting points developed during the progress of the experiment which are worthy of record. The work is to be repeated another year taking advantage of the experience of the present season.

Soil in part of a greenhouse bench was mixed thoroughly and sterilized by means of formaldehyde. The area was divided into eight equal parts each separated from its neighbor by a wooden partition. Two plats were treated with air slaked lime .09 pounds per square foot (2 tons per acre); two others received acid phosphate in the same quantity; the next two received wood ashes in the same amount; while two others received well-rotted steamed manure .45 pounds per square foot (ten tons per acre).

On June 16, 1912, perfectly healthy plants grown from carefully selected cuttings were placed in one of each of the four plats while in half of the other four were placed plants each one of which had been grown from a cutting bearing a definite lesion. Cuttings with large lesions died in the sand and the diseased plants used in this experiment had grown from cuttings with small lesions. In general appearance these plants were about as good as those grown from healthy cuttings. The other half of the plants were furnished me by a grower. All of them had well-developed roots every one of which was infected. These plants made an attempt to grow, pushing out new leaves from time to time. Nearly all died a lingering death, leaf by leaf curling up and withering. The very few that survived never bore any flowers and do not figure in the yield. On August 26 the following condition was noted: Of the healthy plants those grown in stable manure appeared the best but those in the phosphate plat were a close second. Those in the lime and wood-ash plats were decidedly inferior.

Of the diseased plants those in the stable-manure plat were much the best. The plat in general appearance resembled much the healthy plants in the limed plat. Plants in the wood-ash plat were very poor indeed while those in the phosphate plat were little better. Those in the limed plat showed yellowish crimped leaves but not so pronounced as in the phosphate or wood-ash plats.

During August and September dead plants were removed from time to time. On October 27th the condition was as before. Of the healthy lot the manured plat was best. The phosphated plat was second, but not a close second owing to the loss of many leaves from marginal leaf burning apparently due to the acid phosphate. The wood-ash plat lagged behind, many of the plants having very few runners even at this date.

Of the diseased lot the order was as formerly; in the manured plat four of the black-rooted plants were still alive though they never bore any flowers. Some of the other plants had made an excellent growth. The runners were too numerous, too fine and wiry, and the foliage had a slightly yellowish color. The wood-ash plat was the poorest. On this date all of the plants were small with little prospect of living long. A few plants in each of the other plats seemed vigorous, but the majority were either dead or sickly.

During the course of the experiment, of the healthy stock, 6 plants in the limed plat died, one of them with the Thielavia disease; four plants in the phosphated plat died, all from other causes than Thielavia; none died in the manured or wood-ash plats.

Of the diseased lot, 8 died in the limed plat, 15 in the phosphated, 5 in the manured, and 13 in the plat treated with wood ashes, all with the Thielavia disease. Many others were nearly dead when the experiment was terminated on December 9, 1912.

When the plants were removed many of them were found in bad condition (Plates 1 and 2). The fact that so many diseased plants had persisted is easily explained by examining the photograph, many plants exhibiting the same character. The repeated development of new roots above the point of infection with the development of roots from the runners carried the plant along long after most other kinds of plants would have succumbed.

The average number of flowers per plant (counting only those plants alive on Oct. 27) for the various plats was as follows: Healthy stock, limed plat, 6.4; acid phosphate, 10; stable manure, 11; wood ashes, 5.4. Diseased stock, limed plat, 5.7; phosphate, 5; manured, 7.6; wood-ash, 3.

It can be seen that the stable manure gave best results. As this is a well-known fact the experiment was faulty in that the chemicals were not applied in addition to manure.

It may be questioned whether acid phosphate could be expected to yield results when the plant is already diseased before it is placed in the soil. The protection of newly-developed roots, however, might have been expected. Unfortunately the actual tests for alkalinity and acidity were not made.

Spraying. It would be desirable to prevent infections on the runners if there were any practical way of effecting it. Any of the common fungicides used as a spray would probably be effective providing the spray could be applied thoroughly. Those who have sprayed violet foliage, however, (Galloway (1903), Halsted (1895), and Dorsett (1900)) advise against it on account of injury. Furthermore it would be nearly impossible to cover the runners on the underside with the spray. New roots too, issuing from the runners at frequent intervals, permit of carrying infection from spores in the soil to the runners without the possibility of intervention by a fungicide.

Water relations. Many growers think there is a close relation between the method of watering, particularly the quantity of water used, and the occurrence of this disease. Recent experiments in England by Chittenden (1912) seem to bear out this belief. It was found there, as well as in other places, that infection does not occur readily on the roots of plants, except when they are grown in soggy or water-logged soil. The writer has lately been attempting to infect the roots of tobacco and sweet peas with the Thielavia fungus. Considerable difficulty has been experienced. A good many plants have developed typical lesions of the disease but the amount of disease has not been very great. The soil used in these experiments has been a rather light soil and one which drains readily. The failure to obtain infections is attributed largely to the fact that the soil cannot be kept wet enough.

Crown Rot.

Only brief mention will be made of this and the other diseases to be discussed. The crown rot as the name signifies is a rotting of the crown of plants with the subsequent death of many of the runners. The same disease occurs in the cutting beds and is commonly known as damping off. In both cases the tissues become slimy and rot very rapidly.

The disease occurs in areas where plants have been too wet, often under a leak in a water pipe or during prolonged wet weather under a hole in the roof.

The disease is apparently caused by a fungus although no one seems to have studied it extensively. The organism in its vegetative and sclerotial stages has the appearance of a Sclerotinia. Possibly it is *S. libertiana* a very common disease producer.

The species of Sclerotinia are, for the most part, ones that take advantage of plants in weakened condition. They more often exist as saprophytes and are not particularly choice about source of food. For that reason it is doubtful whether sanitary measures recommended in the case of the Thielavia root rot would prove entirely effective. Here is a case where the good health of the host plant is of importance in disease control, whereas with the more active parasites, constitutionally sickly plants are frequently un-

attacked. Since the water-soaking of soil leads to an unhealthy condition and seems to be the most frequent attendant circumstance of this trouble the matter of control is relatively simple. Aside from the removal of diseased plants some growers seem to have checked the spread of the disease by heavy dusting of air-slaked lime in the affected region.

Leaf Spot Diseases.

As the name implies these diseases are characterized by certain definite spots on the foliage. There are a number of different organisms concerned each one of which forms a perfectly distinct and definite type of lesion. The more important ones, however, are *Alternaria violae* and *Phyllosticta violae*. Dorsett (1900) and Galloway (1903) regard the disease caused by Alternaria as the most serious violet disease but leaf spots of any kind have not been particularly destructive in our houses in recent years except in a few instances. In one house, however, the Alternaria disease was very destructive for a number of weeks. The owner of the house picked off infected leaves as fast as they appeared, but was not successful in checking the spread of the disease so that nearly all of the foliage was lost. He complained particularly of not having the necessary foliage to surround the bunches of flowers; even greater damage was done by the loss of so much leaf surface which decreased the vitality of the plants.

Spraying of violets for foliage troubles has met with indifferent success according to experiments of Halsted (1895 and 1898), and Galloway (1903) advises against the use of spray. If the plants are watered late in the day the clinging drops of water should be knocked from the foliage by passing over them a long stick held at a level which will cause the leaves to bend and then spring back suddenly. Careful attention to watering and the prompt removal of spotted leaves are the precautions to be observed in combatting these diseases.

Gray Mold of Leaves.

Leaves and stems often turn yellow or brown and in a day or two become covered with a gray mold. This mold is a fungus of the

genus Botrytis possibly *Botrytis vulgaris*, a very common organism living mostly as a saprophyte and only occurring on living plants that are very low in vitality. Whenever a leaf or stem is broken or is girdled by Thielavia, Botrytis is apt to appear on it to complete the destruction. The occurrence of the mold in the house is not of itself to be regarded seriously.

Explanation of Plates.

Plate 1. Violet plant grown from infected cutting. The plant was placed in phosphated soil June 16 and persisted there until November 5, 1912, the date of making this photograph. The plant was lifted from the soil very carefully in order to preserve all the roots. The stem is broken slightly at the point of the original lesion. Foliage was a very sickly yellow. Natural size. No. 6145.

Plate 2. Two violet plants with the Thielavia disease, grown from infected cuttings. Photograph made November 12, 1912. Note the dwarfed foliage, the repeated efforts of the plants to live by the development of new roots from above the point of disease and the numerous infections on the new roots. Natural size. No. 6177.

Bibliography.

This bibliography is by no means complete but contains some of the more important references to the disease.

1876 Zopf, W. Thielavia Zopf. Genus novum Perisporiacearum. Sitz. Bot. Ver. Prov. Brandenb. **18**: 101–105. 1876.
Describes the genus Thielavia.

1892 Thaxter, R. Fungus in violet roots. Connecticut Agr. Exp. Sta. Rept. **1891**: 166–167. 1892.

1895 Sorauer, P. Ueber die Wurzelbräune der Cyclamen. Zeitschr. Pflanzenkr. **5**: 18–20. 1895.

1895 Halsted, B. D. Experiments with fungicides for violet diseases. New Jersey Agr. Exp. Sta. Rept. **1894**: 386–389. 1895.
Bordeaux mixture seemed to have little value for leaf spot. Ammoniacal copper carbonate was injurious.

1897 Peglion, V. Marciume radicale delle piantine di tobacco, causato dalla Thielavia basicola Zopf. Atti Reale Accad. Lincei V, **6**: 52–56. 1897. Reprinted Centbl. Bakt. 2, **3**: 580–583. 1897.

1898 Halsted, B. D. Greenhouse experiments with violets. New Jersey Agr. Exp. Sta. Rept. **1897**: 383–393. 1898. Manured plat gave best yield of flowers. Sprayed plats were the poorest.

1900 Dorsett, P. H. Spot disease of the violet. U. S. Dept. Agr., Div. Veg. Phys. and Path. Bul. 23: 1–16. *pls. I-VII.* 1900.
Describes the spot disease caused by Alternaria violae as the most serious violet trouble.

1903 Galloway, B. T. Diseases and insect enemies [of the violet] Chapter VIII in Violet Culture, New York, 1903. [Second edition].

1904 Selby, A. D. Tobacco diseases. Ohio Agr. Exp. Sta. Bul. 156: 87–107. 1904.
Reports the occurrence of Thielavia on tobacco roots in America.

1907 Clinton, G. P. Report of the Botanist for 1906. Connecticut Agr. Exp. Sta. Rept. **1906**: 342–368. *fig. 14.* 1907.
Extended description and illustrations of the tobacco Thielavia with bibliography.

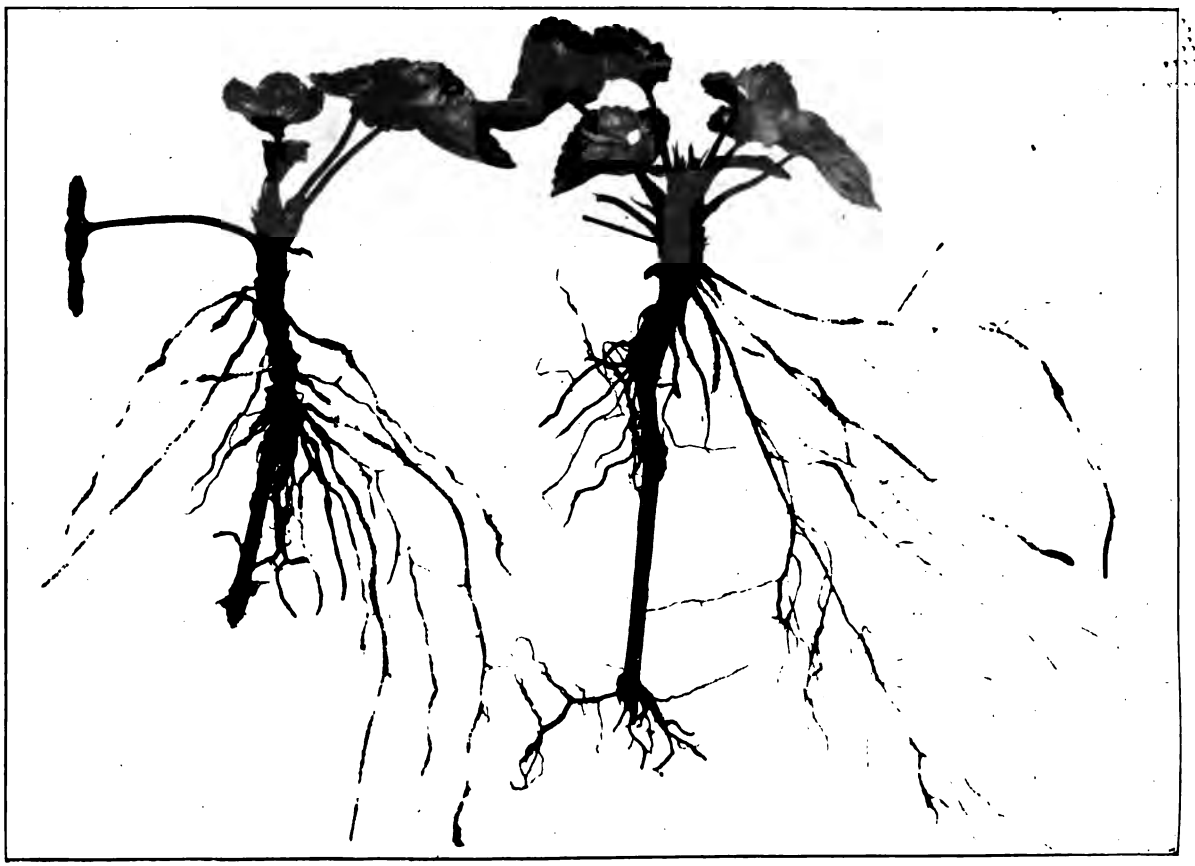
1908 Briggs, Lyman J. The field treatment of tobacco root-rot. U. S. Dept. Agr., Bur. Plant Ind. Circ. 7: 1–8. 1908.

1909 Gilbert, W. W. The root-rot of tobacco caused by Thielavia basicola. U. S. Dept. Agr., Bur. Plant Ind. Bul. 158. 1–48. *pls. I–IV.* 1909.

1910 Foex, Et. Maladie du pied de la violette. Ann. École Nat. Agr. Montpelier, N. S. **10**: 165–171. *pl. 6.* 1910.
Describes the violet disease caused by Thielavia basicola. Illustrates the fungus in all its stages.

1912 Chittenden, F. J. Some new or little known plant diseases in Britain. Jour. Royal Hort. Soc. London, **37**: 541–550. 1912.
Ascribes a root disease of sweet peas to Thielavia basicola.

1912 Massee, Geo. A disease of sweet peas, asters and other plants (Thielavia basicola Zopf) Bul. Misc. Inform. Kew, **1912**: 44–52. *pl. I.* 1912.
Contains historical information on Thielavia basicola as well as a discussion of these diseases.



THE GLADIOLUS AND ITS CULTURE.

By B. Hammond Tracy, Wenham, Mass.

Delivered before the Society, March 8, 1913.

When I received the invitation to address you on the subject of the gladiolus and its culture I was very glad to accept as it affords me just one more opportunity to try to interest the flower-loving public in this magnificent flower.

During recent years much has been said and written in regard to its history and development, but I shall confine myself, in my talk this afternoon, to its culture and uses.

The gladiolus commends itself to every one because of its easy culture and its long period of bloom. No flower should be neglected, but the gladiolus can be planted and neglected, even though the weeds are not cleaned from the bed. It is bound to find a way to the surface, and with a spike strong enough to be found amongst the weeds. So for this reason many a gardener who has at times to neglect his garden, or at least parts of it, finds the gladiolus will survive and come forth with an abundance of bloom, provided he does give it some attention.

In order to have a long season it is well to plant the bulbs very close together in flats or boxes of loam, or better yet, in cocoanut loam. You can gain at least a month. They transplant very easily and all that is needed is moisture to induce the bulb to start roots. It is better to keep the boxes in a partially shaded position, and not too warm, so as to start root growth rather than the spike. When the spike starts, as it always does on some varieties, in the early sping, it is well, when planting, to clean off all the husk, as it starts roots much quicker than when planted with the husk on.

In fact, it is always better to clean off the husk when planting after May 1st, but before this, I should advise leaving the jacket on, as the ground is cold and the bulb seems to do better if not entirely exposed to the cold soil. Bulbs can be planted in the open as soon as the frost is out of the ground without danger for by the time the spike reaches the top of the ground all danger of frosts will be past. The bulbs which you have started in the boxes should not be planted out until all danger of frosts is past. You will also find it quite an advantage to have some ready to plant in spots where some seed has failed to germinate, or in some corner in front of shrubbery.

By continuous planting at intervals of two weeks, up to June 15th, or even as late as July 1st, one can have a continuous succession of bloom from early July until frosts.

A better way to have a bed of continuous bloom is to plant all at one time, but different sized bulbs. I mean by this, say for instance, if you were planting America, have some bulbs that do not quite measure one inch in diameter and then running up to the very large bulbs. By so doing you would have perpetual bloom, for the large bulbs would bloom first and the smaller ones follow along as fast as they mature. This does away with making several plantings at different times, which is not nearly as convenient, especially if you want to have something planted in amongst the gladiolus.

It is not necessary to buy the most expensive varieties, especially when one wants them for cut flowers or for garden decoration. In order to have a large named collection one must buy the more expensive varieties, as new and rare kinds must be expensive. A good mixture gives splendid results, but if one cares to carry out a color scheme it is much better to buy named varieties of a certain color, but in this case also, it is not necessary to produce the effect with the most expensive varieties.

One of the most essential things to know is the habit of growth of the different varieties, so that you may select something which will give the desired effect. If cut bloom is wanted as well as garden decoration, the varieties with slender and more or less twisted and crooked stems will give the best results for vase arrangement. The flowers will answer a double purpose when grown in the garden if, after two or three flowers have opened, you cut the

spike and take it into the house for further development. In this way you have the garden effect for a time and the pleasure in the house as well, at the same time keeping your garden in a neat and tidy condition. When any flower is left in the garden to bloom to its limit it gives a ragged and unkempt appearance.

When color alone is wanted in the garden the best varieties for this purpose are those with a strong, vigorous growth of spike as these will stand up without staking and will bloom almost to the end before they have a ragged appearance. A few of the varieties for this purpose are Independence, Mrs. Francis King, Dawn, and America in the pink section, while lighter varieties giving splendid effects are Jean Dieulafoy, I. S. Hendrickson, and Augusta. In yellows, Sunrise, Canary Bird, and Madam Lemoinier or Golden Queen. In purples, Baron Hulot, Royale, and Scarsdale for mauve; Harvard and Cracker Jack for rich dark reds; and Brenchleyensis and Mrs. Beecher, also Princeps, for brilliant reds. For a color combination, you will find nothing better than a planting of America, Sunrise, and Baron Hulot. Another good one, is a bed of Cracker Jack, Isaac Buchanan, and Augusta.

These same combinations make most effective bouquets. There are many other combinations that are good for massing, but I have mentioned those which I consider superior and yet at a moderate price. I am much in favor of large plantings and for this reason advocate the more reasonable priced ones. Too much cannot be said of the sterling qualities of Independence. It is such a remarkably strong variety and the color holds so well in sun and storm, as well as the flowers, and the foliage is always a deep rich green, in perfect contrast with the brilliant rose pink of the flowers.

But few people plant their bulbs close enough together. It is much better to do so, as they help support each other and when in bloom you have a wealth of color and the foliage covers up the bare ground. This effect cannot be produced when they are planted too far apart and give a straggly appearance.

Let me repeat again, that to get the best results, whether your bulbs are mixtures or named varieties, you must plant bulbs of considerably different size, some large, some small. You will get better results and you will get a longer period of bloom. Yet I am afraid if your seedsman should make you such a shipment, without

explanation, he would receive word from you, that some of the bulbs sent were too small. Whenever it is possible for me to explain this to my customers, I do so, but otherwise it would be impractical for me to make a shipment without grading the bulbs as to size. The essential thing is that the bulbs are of blooming age rather than size.

Splendid effects may be produced by planting a bed of snapdragons and gladioli, setting out the plants at the same time you plant the bulbs, with due regard for the combination of color when in bloom. The bulbs will soon come up, the snapdragons will cover the ground, so that a few bulbs will cover a greater space. It is not well to plant bulbs among flowers which give too much shade to the bulb in the early stages of growth; that is to say in peony beds or in thick rose beds. If the rose bushes are scattered in a bed, there is no better flower to grow among them than the gladiolus. They will do well planted among almost any annual and much better garden effects can be derived by planting in this manner; but you must bear in mind that the bulb must have the advantage of being started before the other flowers shade the ground.

When the gladiolus blooms are wanted purely for cut flowers, the best place for planting is in the vegetable garden, planting them two to three inches apart in the row, rows far enough apart to permit of thorough cultivation, and at least five or six inches deep, according to the size of the bulb. To get the best results you must plant deep for the new bulb forms on top of the one you plant, before it blooms, and in order to get the ground support for the roots as well as for the flower spike, it must be planted this depth. I plant a great many of my bulbs eight inches deep, especially when I want exhibition blooms.

When planted shallow, the first wind storm blows over the spike, naturally loosening the bulb and breaking off some of the roots, thereby losing vitality, and giving inferior bloom, if it blooms at all.

When planted deep, it takes a longer time for the spike to reach the top of the ground and the soil should be worked over and kept loose; I do not know that this is any more essential for the gladiolus than for any flower.

I have said nothing about the preparation of the soil, as they will do well in any garden, in any soil, prepared as any garden should be.

I wish that the gladiolus might be grown this year in every garden, and I also wish that my suggestions as to planting and cutting might be followed for I feel sure that the results would guarantee satisfaction.

FERTILIZER PROBLEMS OF THE ORCHARD AND GARDEN.

By Prof. G. E. Adams, Kingston, Rhode Island.

Delivered before the Society, March 22, 1913.

As long as man continues to cultivate the orchard and garden there will be presented to him fertilizer problems. No sooner do we solve one problem than there is presented to us some new question to be answered. It is the ability of the grower to meet these new problems and solve them which measure his success as a gardener or orchardist.

Fertility means more than mere plant food. Some of the soils which contain the largest amounts of the mineral elements of plant food are non-productive because of the absence of some condition which is necessary in order that those plant food elements may become available to the plant.

A fertilizer may be defined as any substance which, when added to the soil, will increase its crop-producing ability under favorable conditions. This action may be upon the crop direct or it may be upon the properties of the soil and thus indirectly upon the soil. Therefore we may classify all of the fertilizing materials in two large groups. First, the direct fertilizers or those which furnish one or more of the so-called essential elements of plant food, nitrogen, phosphoric acid, or potash. Under this head will come the commercial fertilizers such as nitrate of soda, acid phosphate, muriate of potash, etc., and the farm manures. We may call this group the nutritive fertilizer group. The second group consists of the indirect fertilizers or those materials which may not of themselves furnish

any needed element of plant food, but which exert a beneficial effect upon the soil or soil compounds which results in increased crop production. As examples of this group we may mention the calcium compounds and the green manure crops. The materials in this group are known as the stimulant fertilizers.

We have passed the time when we consider the soil as simply a mass of inert material from which plants grow, and have come to look upon it as a manufacturing plant which is turning the raw fertilizing materials into finished products pleasing to the sight and taste of mankind. Personally I like to consider the soil as a group of laboratories, biological, chemical, and physical, and our fertilization, whether it be the addition of direct plant food or of a stimulant, has for its object the keeping of these laboratories keyed up to the highest state of efficiency.

On many of our New England soils the lack of efficiency is primarily due to a lack of decaying organic matter or humus. If proper attention is not paid to the organic matter of the soil, it matters not how much plant food be applied to the soil, the result will be a constantly diminishing yield until the returns received will no longer justify the expenditures for plant foods.

In the case of the orchard, the crop residue for maintaining organic matter in the soil is confined to the leaves which annually fall to the ground, and in the vegetable garden, as a rule, the residues returned are far from sufficient to make up the loss of organic matter accompanying the growing of vegetable crops under our modern intensive market garden methods. On this account we must have resource either to the green manuring crops or to stable manures or to a combination of the two. The stable manure aside from the value of the direct plant food contained therein which we may express in dollars and cents has a value upon which it is impossible to put a price. This is the effect upon the soil in bringing to it organic matter, as a promoter of the growth of the useful organisms within the soil, especially those which have to do with the nitrifying processes; also its value as a promoter of plant growth, repeated trials showing that the results obtained from the use of stable manure on soils of certain types, especially those deficient in organic matter, cannot be secured when a like amount of plant food in commercial fertilizers is used.

The greatest value of the green manure crops is in furnishing and maintaining the supply of organic matter in the soil. The amount of material added will vary from three to ten tons of green vegetable matter per acre, depending upon the crop grown and the stage of maturity at the time when it is added to the soil. In addition to the green material thus furnished, the green manures have a beneficial effect in decreasing the injurious bacteria of the soil.

Investigations have shown that in fields left fallow the loss of nitrogen from the soil due to the action of injurious bacteria is in some cases four or five times as great as the amount of nitrogen removed in the growing crop. These injurious bacteria are found to disappear very largely in the presence of green crops. Especially is this true in the case of some of the leguminous crops which, in addition to the prevention of the loss of soil nitrogen, will add a very material amount to the soil supply, if soil conditions are favorable for their growth.

The effect of the green manuring crops in concentrating within their tissues the plant foods which are being made soluble at the time of year when their growth is most active, is also a very important point for consideration in their use. In the case of orchards the trees of which are making too much wood growth, the introduction of green crops to compete for both food and water at a time when the plants are making a too succulent wood growth which would be liable to injury by freezing is a very desirable procedure, as by this method the plant food can be put into growth which, if turned into the ground early enough in the succeeding season, will assist in wood growth at a time when such growth is desired.

As to the type of green manuring crop which we shall use in the orchard, whether it be a nitrogen gatherer or a nitrogen consumer, will depend upon the type of soil, kind of orchard, and also upon the age of the trees. In general, it may be said that for the peach orchard the leguminous crops should be used with caution; in many cases it will be found desirable to alternate a leguminous crop such as crimson clover or soy beans with a non-legume as buckwheat or rye. In the case of apples, the system of green manuring will need to be varied, depending upon the age of the tree.

On many soils leguminous crops are used when the trees are young and it is desired to obtain as much wood growth as possible;

later, as the trees approach the bearing age, it is often found desirable to change the type of cover crop in alternate years or to use a mixture of legumes and non-leguminous crops so as to check the wood growth and hasten the formation of fruit buds. In the case of old orchards which have been neglected and which it is desired to rejuvenate, the best results are secured when the legumes are used as green manure crops.

In vegetable growing green manuring at present plays but little part, owing to the high value of much of the land used. The large applications of stable manure furnish a supply of organic matter at a smaller cost than the same amount of organic matter in the shape of a green manure crop could be secured when we consider the time required for its production and the consequent loss of a money crop. With the continued increasing demand for the vegetable products and the constantly diminishing supply of stable manure, the time is probably not far distant when greater recourse will have to be made to the green manure crops. In the case of the market gardener the largest dependence will probably be made upon the leguminous crops in order that the supply of nitrogen be augmented as well as the organic material increased.

Of the mineral indirect fertilizers the calcium compounds are the ones which at the present time are receiving the most attention. Among the functions of the calcium compounds the following may be mentioned: to correct soil acidity, to assist in rendering insoluble plant food soluble, to hasten decay of organic matter, to favor the growth of soil organisms, and to prevent certain plant diseases. The larger number of our cultivated crops give their best returns when grown in soils which are not acid. In general, it may be said that very few of the crops which are not greatly benefited by liming are not injured thereby. Gypsum or land plaster does not have a corrective effect upon soil acidity.

An abundance of calcium compounds in the soil has a very beneficial effect in rendering some of the insoluble phosphates and potash compounds available to the plant. They also favor the decomposition of organic matter, proving especially helpful when used after plowing in green manure crops. The presence of calcium in the form of carbonate plays a very important part in the activity of some of the most important soil organisms, namely

those which are found associated with the legumes and act as nitrogen gatherers. There are certain plant diseases which can develop only in acid media and which may be controlled in a measure at least by the application of certain of the calcium compounds. A disease which comes in this class is the club root of the cabbage. Physically the calcium compounds tend to make those soils of a clayey nature more crumbly and easier of cultivation.

In the use of all of the lime compounds, care must be taken not to use them to excess, otherwise the beneficial actions above enumerated may be more than counteracted by the injurious effects of their application. In the presence of large quantities of quick-lime the decomposition of the organic matter is hastened to such an extent as to make its loss a very serious matter; the formation of nitrates may be so hastened as to result in their formation more rapidly than they can be used by the growing plant with the result that there will be a loss of nitrogen by the nitrates being taken out in the drainage waters. As there are certain diseases which are checked by liming, there are also others which are encouraged by an excess of lime in the soil. A case of this kind is the potato scab.

From what has been said regarding the effect of lime, especially when used in excess, it will be seen that the best results will probably follow the use of comparatively small applications of lime at frequent intervals, rather than the use of large quantities with comparatively long periods elapsing between applications. This is particularly true upon soils of a light sandy nature such as is occupied by many of our truck farms.

As to the form of lime to be employed, I believe there can be no general rule, the form to use being largely a matter of local conditions. In order to get a basis for comparison it should be remembered that to furnish the same amount of calcium oxide contained in one hundred pounds of pure stone lime will require one hundred and thirty pounds of water-slaked or hydrated lime or one hundred and eighty pounds of carbonate of lime in the form of air-slaked lime or ground limestone. To express the comparative value of the three forms of lime on a financial basis it may be said that if a ton of quick-lime can be purchased for seven dollars, in

order to make the price of a pound of calcium oxide the same, we must purchase the hydrated lime for $5.30 and a ton of ground limestone for $3.95.

Were our discussion confined to the orchard problems alone the use of lime would have demanded but little attention except as the calcium content of the soil affects the soil conditions in general. Extensive experiments with young fruit trees at the Rhode Island Experiment Station have shown in the majority of cases that applications of lime have resulted in injury to the growing trees. Of the fruits in this experiment, the cherry, Burbank plum, and quince were the only ones to be benefited by liming while in the group which was slightly injured by liming would be placed the peach, apple, and pear, together with the Concord grape. Of the small fruits, Cuthbert raspberry, gooseberry, and currant were benefited while the blackberry and blackcap raspberry were distinctly injured. Of the garden vegetables the carrot is slightly benefited while the only one which is slightly injured by liming is the tomato. Lime is usually decidedly beneficial to all of the other vegetables.

In the matter of the direct plant foods for orchard trees, there have been a few experiments reported which seemed to indicate that direct applications of plant foods are not beneficial to orchard fruits especially the apple. It is probably only under very special conditions that such results are obtained. It would seem to be utterly impossible to continue indefinitely to grow the fruit trees without an addition of plant food to the soil. Stewart of Pennsylvania has computed the annual plant food draft of mature apple trees to be as follows. The figures include wood, leaves, and fruit and are based upon thirty-five trees per acre. Nitrogen removed 53 lbs., phosphoric acid 15.29 lbs., potash 64 lbs. A crop of wheat of twenty-five bushels per acre of grain and one and one-third tons of straw, according to the average analyses given will remove 43.7 pounds of nitrogen, 15.4 pounds of phosphoric acid, and 26.7 pounds of potash annually. When considering these figures it will be seen that the tree fruits remove practically the same amount of phosphoric acid as the wheat, a fourth more nitrogen, and about two and a half times as much potash. If orcharding is to be successful it hardly seems plausible to advocate the withholding of plant food

elements from the orchard. With the tree fruits the best results, as gathered from experimental data, seem to have been obtained where stable manure has been used as a source of plant food.

In buying commercial fertilizers for the orchard one can probably use forms which are not so quickly available as would be desirable in the more rapidly growing vegetable crops owing to the fact that the trees occupy the ground continuously throughout the year and are able to make use of the plant food for a longer period of time. In fertilizing the orchard, young trees can probably receive comparatively larger applications of nitrogenous material than would be advisable when the trees are approaching bearing age. The potash, on the other hand, may probably be slightly less than in older orchards. In the case of the tree fruits we have the young or growing stage when wood growth is the sole object. At this time we might consider the fertilization to be more purely of a stimulating nature. When the trees reach the age when it is desired to put them into bearing, the nitrogenous elements should be reduced and the mineral elements increased as experimental data indicate very strongly that nitrogen stimulates leaf and wood growth at the expense of the formation of fruit buds. When the orchard begins to produce fruit, particular attention should be given to the potash content in order that we may get fruit of the highest color.

The third type of orchard fertilization which often is necessary in New England is the fertilization connected with the rejuvenation of the old neglected trees. Where such work has been undertaken the best results have been obtained from a formula containing about 8% nitrogen in a quickly available form, 3% of phosphoric acid, and 11% of potash, the percentage of nitrogen being much higher than in the case of either of the two previous classes of trees. The formula which is advocated by the New Hampshire station for young trees contains but 5% of nitrogen, with 8% of phosphoric acid, and 8% of potash. As a source of the nitrogen comparatively quickly available forms may be used although if a rotation of green manuring crops is practiced, after a few years the nitrogen may be entirely eliminated from the applied fertilizer, entire dependence being placed upon the nitrogen added by the growth of legumes.

As a source of phosphoric acid, bone meal and basic slag seem to

be taking precedent today. When those two materials are used, not only will the requisite amount of phosphoric acid be furnished but probably the lime added to the soil will be sufficient to maintain the calcium content of the land without any direct applications of lime as such. As a carrier of potash, sulphate seems to be more desirable than muriate.

We might summarize the fertilization of the orchard by saying that when the trees are young there should be furnished fertilizer enough to keep them in a healthy vigorous condition. This amount will be gradually increased until the trees reach full maturity when the fertilizer applied should furnish at least 50 pounds of nitrogen, 15 pounds of phosphoric acid, and 60 pounds of potash per acre annually, bearing in mind that if leguminous green crops are grown, the amount of nitrogen applied in the fertilizer can be directly diminished in proportion as the growth of the green manuring crop is luxuriant and successful. Stable manure when used should be furnished in quantities equivalent to about ten tons per acre. Orchard fruits are practically the only plants which remove the plant food ingredients from the soil in the proportion in which they are contained in stable manure, hence if one has an available supply of stable manure, no better material can be found for use in the orchard. If the supply of animal manures is limited and dependence must be placed primarily upon commercial fertilizers, the trees should be watched and those individual trees making the least satisfactory growth should receive an application of stable manure.

The fertilizer problems of the vegetable gardener are of a somewhat different nature from those of the orchardist. In the case of the orchardist the fertilizer should be considered as a long term investment while the vegetable gardener must, in order to be successful, receive returns in a comparatively few weeks or months at most. In years past the main dependence for fertility has been stable manure. With the constantly increasing areas devoted to vegetable crops and a corresponding decrease in the number of horses kept in cities to furnish manure, they are now facing a new set of fertilizer problems. The large annual applications of stable manures made have been not from the standpoint of the plant food requirements of the crop, but more with the view of maintaining

the highest efficiency of humus content in the soil. Indications from experiments with the garden vegetables show that by reinforcing stable manure with applications of phosphoric acid and potash better results are obtained from smaller applications thus reinforced than where entire dependence is placed upon the manure alone, the reason for this being that the stable manure is a one-sided fertilizer, being rich in nitrogen and deficient in mineral elements. In the case of those crops which are grown primarily for their leafy portions, the nitrogen content should be comparatively high in any commercial fertilizers which are applied. A good composition for fertilizers of this class is one containing 4% of nitrogen, 8% of phosphoric acid, and 10% of potash, the size of the application depending upon the conditions under which the crop is being grown. In the market garden 500 to 1000 pounds to the acre, when used as supplemental to stable manure, would not be considered excessive. With the root crops the potash and phosphoric acid should be slightly increased and the nitrogen reduced somewhat.

We may define the best fertilization as that soil treatment which constantly tends to maintain the most favorable physical condition of the soil, together with those conditions which are best suited to the growth and development of the favorable organisms of the soil, and, finally, leaving the soil, after removing the maximum crops, in as good a state of fertility as before the crops were grown.

Discussion.

Question. In breaking up land for potatoes how much lime should be used?

Answer. I would advise a primary application of about one ton air-slaked lime to the acre, thoroughly harrowed in two or three weeks before planting time in order to avoid any caustic effects on the land. In case ground limestone should be used one and one-half tons per acre.

Question. I have been informed that lime should not be plowed in; you say it should be harrowed.

Answer. It should be applied broadcast and harrowed in as

soon as possible. Harrow it in immediately after application as it is liable to become lumpy if left on the surface.

Question. What is the value of hen manure?

Answer. Hen manure is particularly rich in nitrogen which tends to leaf production and therefore an addition of phosphoric acid and potash should be applied. To one-half ton poultry manure add 100 pounds sulphate of potash and 700 pounds acid phosphate. Never use lime in connection with poultry manure.

Question. Would lime scattered on the lawn have any effect on sorrel and weeds?

Answer. I should prefer using bone meal.

Question. Is there any fertilizing value in the waste of an acetylene gas plant?

Answer. I can't answer that question definitely. The exact effect of this substance on plant growth has not been as yet established. Some experiments have been tried but more study of the matter is needed. It can be said, however, that it should be used only after exposure to the air.

Question. I have used sulphate of iron on the manure pile to kill fly eggs and larvae. Does it injure the manure?

Answer. No injury to the manure would result from such use of sulphate of iron.

Question. What is the effect of common table salt on the soil?

Answer. The use of salt is simply of indirect value. It has most value as a weedicide but practically has nothing to recommend it as a fertilizer. Better put money in some other material.

Question. How do coal ashes compare with wood ashes?

Answer. In wood ashes there is 35% of lime and some potash. In coal ashes there is no lime present. They simply act as a mechanical absorbent and their only value is to lighten up the soil. They do no harm and are of no value as a fertilizing medium.

Question. What is the value of soil analysis to the average man?

Answer. To the average man the value of soil analysis is very slight. No method of soil analysis would tell you today the amount of plant food available to crops. The purely chemical analysis to a practical man is of very little use.

THE MAKING OF A COUNTRY ESTATE.

By Henry Wild, Greenwich, Conn.

Delivered before the Society, March 29, 1913.

In the suburban districts of almost every large city throughout the country at the present time we can see the familiar sign "Farm for Sale." A few years ago, unless the farm was within reasonable driving distance of railway station or town, the farm that could be bought for the hundred per acre is now asking the thousand. The result is that land lying farther back in the country is being bought for private estates — that was practically unknown before.

There are several reasons for this. In the first place the automobile has made the matter of distance a pleasure, and the desire for a farm as well as private grounds, is the rule instead of the exception today.

Eight years ago I accepted a position to assist in the laying out of a large estate in the suburbs of Greenwich, Connecticut. At that time the place consisted of a series of farms to the extent of 650 acres, a distance of 37 miles from New York City, 6 miles from a car line, and 7 miles from the station. The nearest town was Greenwich, and during the early weeks of spring the roads were almost a quagmire. Today this same estate has an acreage of nearly 2000 acres, while all around us are other private estates and farms. These few remarks will serve to illustrate the trend of the times.

A new district is opened up and hundreds of acres are planted to peaches and apples — orchards that formerly were running wild and unproductive. What is being done here can be accomplished in almost any part of New England, where abandoned farms or non-productive ground is common. The farms on either side of

the road, having since been bought up and turned into beautiful estates, have been sufficient incentive to cause the town to build a system of good roads, and so enhance the value of the adjoining property.

We will suppose that land to the extent of 50 acres or more has been purchased with the intention of making it into a home for practically the year round. If it is like the average New England farm there will probably be an acre or so of apple orchard, some woodland and rough hillsides, which taken as a whole proves an interesting place to develop. I use the adjective interesting with the idea that the owner intends to spend some of his spare time in the developing of the place. It will, during the first year, solve the question of "Where shall I spend my vacation?"

There is probably an old farmhouse on the place that can be turned into a temporary summer residence, with buildings that can be utilized as garage and stable, and so enable the family to be in close touch with the place and help them to form plans for its future.

I would advise engaging the services of a practical landscape architect to make a few visits, and with your Superintendent go over the place and note everything likely to be of use and otherwise. It does not matter how great the experience of a landscape man may be, you have ideas of your own, and a good Superintendent who is likely to be with you long after the landscape architect has departed from your particular place, will be able to point out things that probably would not come under the notice of the others.

Take note of all trees; some may be in the way, but before you cut a tree down find out if it would not be of use somewhere else. If they are fairly good specimens transplant them. It is easy to transplant most varieties with frozen balls, or perhaps you can use them as a screen, or to give height to the group planting on another part of the estate. If they happen to be evergreens, and not worth transplanting, you may need their branches to protect newly planted rhododendrons or other evergreens the first winter.

Talk the subject over thoroughly with your own man before doing a thing. You can test his ability at the start. Spend a day or two this way and have definite plans to work upon. It will be capital and time saved.

First select the site for your home as all things are second to that. Once that is determined everything else can be planned accordingly. The flower gardens, vegetable gardens, and greenhouses (if you want them), garage, barns, etc. all take time and much thought as to their position and adaptability. Perhaps there is a pond or stream on the place that can be enlarged and used for water planting in summer and for providing your own ice from year to year.

Water is an attractive and useful feature on any estate, and an entirely different style of planting can be carried out in its vicinity from what you could do on the higher ground, and adding in its own peculiar interest features that are natural and always interesting. We have a colony of ducks, mallards, and pintails that stay year after year with us, raising their young, and always coming to the feeding ground in the late afternoon.

Management.

If you have been fortunate in engaging the services of a capable Superintendent he will study your interests from the beginning and save you much worry and expense by carefully planning the work ahead and making direct use of all material on hand. It is double hauling and shifting of soil, stone, etc. that runs up your expenses; doing work in the summer that could be done far better and cheaper in the winter, such as clearing rocks, thinning out of woodland, hauling the material over the snow on sleds or stone boats, and so saving a great deal of useless lifting, cutting up of ground, and keeping the permanent force and teams busy during winter, also pushing the development of the estate along on the line of least resistance. Here is where the trained man counts. What you pay in extra salary is offset many times the first year by skilful handling of labor alone.

Labor.

In regard to labor, you will find it difficult to engage native or English-speaking laborers. We could not engage enough at any time. Italians, Poles, and Hungarians form the greater part of unskilled labor in the vicinity of New York.

The Italian is quick to learn, and if properly handled and shown what to do, he will take great interest in his work. We have found the Poles to be better perhaps on heavy work, while both Poles and Hungarians are excellent on the farm.

It is a rare thing to find an Italian who can use a scythe, but in general garden work requiring neatness and skill they are excellent. I must admit that I was prejudiced against Italian labor at first, but I soon lost that feeling and today, as a good workman, the Italian laborer has my respect.

During the past eight years we have engaged scores of mixed European laborers, and the fact that there has not been any serious trouble to call for outside aid speaks for itself. I find them well behaved, obliging, and willing to do a full day's work and rarely absent. Treat them like men and show them how you want it done and they will do it. "Their's not to reason why."

Avenue.

In the making of the avenue any useless walls can be taken down and the pastures cleared of all surplus stones or rocks and utilized for the making of the road bed. The foundations of old buildings that have to be removed can be used for the same purpose, and by using up waste material in this manner you are accomplishing the clearing of the ground, saving extra hauling and useless expense.

The top soil taken off the site of the avenue, if not wanted in the immediate vicinity, can be used in many different ways. If stacked up for a time excellent material is at hand for the planting of trees, or it may be wanted for filling in around the residence, the making of a terrace, greenhouse compost, or a dozen different things. The point I want to emphasize is this — make use of all top soil and all other by-products. With the house and avenue selected you have the two most important features decided.

Now for the avenue planting no set rule can be followed. The natural conditions of the estate should play the most important part. As to the ultimate plan, personally I favor the grouping system, taking advantage of any large native trees that may be on the place. The line planting can be followed in one place that would entirely spoil another. Groups and individual specimens

allow vistas, and give a better opportunity, as a rule, to show up points of interest.

Should the entrance be at the narrowest part of the estate close planting of pines or other evergreens, with a few birch, red oaks, or trees of similar nature, make a fine combination for the year through. The native dogwood is never seen to better advantage than when allied with evergreens. The same can be said of forsythias, *Cersis canadensis*, and numerous other shrubs.

As the place widens plant with more individuality. Should there be considerable native growth, take advantage of same. Cedars, rock maples, tulip trees, sour gum, and sumach predominate in our vicinity, and quite often thinning out is required on one part, while another is devoid of any trees.

Follow the natural conditions as far as possible. To suggest any plans without seeing a place is impossible. The trees that are in the way in one place might prove ideal to further your planting scheme in another. I do not mean to infer that where native growth is luxuriant that nothing else must be introduced. On the other hand, a combination of planting that will blend with natural conditions is desirable. For instance, rhododendrons, mountain laurel, azaleas, etc., will look natural and generally speaking thrive under the above conditions, while blue spruce and other colored conifers will appear out of place. Keep formal trees for other surroundings; for an open country you have a great variety of suitable trees to select from, as follow: maples, oaks, elms, and beech. If line or row planting is to be followed, maples usually predominate. The sugar and Norway seem to have first choice. Elms make a stately appearance. The chief objection to the elm in most sections in latter years lies in the fact of its being ravaged by insect life. Poplars can be used where quick growth is desired. For color effect in fall, the sugar maple, red and pin oaks are hard to beat.

For an avenue of shorter length, the Schwedler maple, when well-grown specimens are used, make an ideal tree glorious in their early foliage, but rather too dark a color for later in the season where a greater length of avenue is required. We have just the reverse of character and habit in the Geneva maple, opening green and turning to the brighter color as the season progresses. From

my experience with the Geneva maple it does not make such clean straight stems as the others of this family, but is grand for groups. Lindens and tulips are both desirable avenue trees — it is a matter of choice. For groups most of the trees named are good. In combination groups, the Geneva with the lower growing Ginnala in the foreground go together nicely, the latter being fine for color effect in fall and is ideal when used with cedars on dry hillsides. The native barberries and cedars are splendid for a similar effect, also the scarlet oak and white pine, birch with hemlock, pines, mountain ash, hemlock, the dark leaved barberry, and others too numerous to give in detail.

Many of the finer varieties of evergreens can be used as specimens or grouped. The blue spruce and varieties, Englemanii, white spruce, Norway spruce, orientalis, pinsapo are all good for either purpose being hardy and of good appearance.

Among the firs we have concolor, quite hardy and makes a grand specimen. Nordmanniana and pectinata are both fine trees, but in very exposed places will burn and also show effects of severe winds. I have seen Norway spruce badly wind whipped under the same conditions. Veitchi and Fraseri make fine individual trees, the latter doing well in moist ground, as will also the balsam fir. Douglasii is a tree of graceful habit.

Two splendid evergreens well worth planting are *Abies brachyphylla* and *umbellicata*, neither of which burn or show any effects of hard weather with us. I consider both very desirable firs. Among the pines the white, Scotch, Austrian, densiflora, and resinosa are leaders. The three last named being rapid growers and perhaps not so long lived. Excelsa provides a change of color. Cembra and mughus are splendid for formal work. They make a fine combination where a lower growth is desired. The dwarf variety of densiflora is ideal for formal planting, but I am doubtful if it proves hardy in the North. The Retinisporas afford a charming variety of colors and habit that appeal to everyone. To enumerate them would take too long.

The same applies to the Thuyas; for variety in sizes and color effect and also adaptability they are extremely useful. Two fine hardy Thuyas are Rosenthali and Standishi, the latter having more of the drooping habit, while the former is an erect grower.

Among the hemlocks are the Carolina and Hookeriana, both ornamental and hardy varieties. Sieboldi is a graceful type and fine for garden planting. The umbrella pine and several of the arbor-vitaes are ideal for this work, also many of the Retinisporas and junipers.

Formal Gardens.

Formal gardens can be made a pleasing feature, even in the winter, by the use of evergreens. As a background to flower beds or borders, they are unsurpassed, also used with hybrid rhododendrons or as a relief between beds, they make a division between colors that would sometimes cause anything but harmony. Formal gardens, often beautiful in summer, are as a rule an eyesore in the late fall and winter. After the bay trees, box, etc. have been removed, and the flowers killed by frost, they present an object lesson of "what might have been." With the planting of evergreens, of which we have so many beautiful and hardy varieties, the transformation scene is not quite so severe.

The beauty of a bed of peonies is greatly enhanced by a setting of evergreens; the same with rhododendrons. If some of the hardy lilies, such as auratum, speciosum, Henryi, and the beautiful species recently brought to us from China, are planted between the peonies and rhododendrons the effect in late summer is glorious. The old-fashioned tiger lilies, planted in a bed of *Taxus canadensis* and *capitata*, relieved with a few Carolina hemlocks, are very effective.

The method we have followed in the transplanting of evergreens is as follows: Be sure the roots are not allowed to become dry by being exposed to the air, especially drying winds. Have a hole made that is somewhat larger than the spread of the roots when laid out. Have one man take care of the roots alone, while the others are filling in the soil, so that they are laid out in a natural manner and not bunched. Firm the soil as it is put in several times, leave a basin round the tree and fill in with water. This settles the soil and gives the tree a good start. When the water has all soaked away, stake the tree if necessary and fill in the balance of soil. This forms a dry muloh preventing rapid evaporation; the trees are sprayed every afternoon in dry weather. I

firmly believe that this spraying is half the secret of success in transplanting evergreens.

Two men with a barrel sprayer, similar to those used in orchard work, can spray a hundred or more in an hour. Do not say you cannot get water near them; if you want to spray you can use a one-horse express wagon with several barrels of water, and refresh the trees with a light mist. If you are only planting a few, a bucket pump and one boy will do it. Spray anyway.

The Darwin and May flowering tulips, with a setting of evergreens, are seen at their best. When the tulips are over the bed can be planted to annuals that flower all summer, such as verbenas, *Phlox Drummondii*, antirrhinums, heliotrope, begonias, etc., and the tulips left in to flower the next season.

I would like to tell of a few combination beds we had last year in the formal garden.

Heliotrope and the yellow calla.

White *Phlox Drummondii* amd *Salvia patens*.

Yellow antirrhinmus and mignonette.

Pink *Begonia semperflorens* and white ten-weeks stock.

Sweet alyssum and nigella, Miss Jekyll.

Begonia Vesuvius and candytuft.

The heliotrope and yellow callas were in the foreground of specimen blue spruce. The spruce in a grass setting; hardy chrysanthemums are used in the same bed for late fall.

The question of what to use in a formal garden has been the cause of much debate, and I am very pleased to see the trend is for saner and more natural planting and so bringing about a distinct type of American garden that is suitable for our climatic conditions and allowing the use of our native evergreens and trees, with which we are able to produce a setting that appeals to the many lovers of nature, who, when in their country homes love to be near nature, as a change from the artificial surroundings of city and business life.

My idea might appear radical in this respect, but my appeal is for the American garden as distinct in its general character as our climate and conditions are from those of southern Europe. Perhaps my long stay in beautiful and natural surroundings has a great deal to do with it, as the ideas of man are formed to a great extent by his environments.

The American landscape is peculiar in itself, and we have reached the stage where instead of copying Europe literally, we have to fashion our gardens to suit their surroundings. As the majority of new estates are made farther out in the country, conditions as a rule favor the old-fashioned gardens. What is the charm that the old-time garden holds for us, its background or setting? Perhaps its simplicity when compared with its contemporaries of today. If they can be given a natural wood background, with the addition of a few pines, hemlocks or cedars, to which can be added native dogwood, the sweet clethra, mountain laurel (some of these at least can be found in the vicinity, or easily procured) we have the material with which to form a beginning.

Lilacs, mock orange, the spireas, wiegelias, and also some of the viburnum family, forsythias, and many other shrubs, from which you can take your choice, lend added interest to this style of garden. When planted in an informal manner, they give a natural or broken outline, at the same time serving the double purpose of prolonging the flowering season and adding after that a wealth of foliage, giving to the perennials and other flowers a setting that is not only necessary but essential.

Hollyhocks, delphiniums, aquilegias, phlox, foxgloves, dahlias, tritomas, hibiscus, and many other old favorites that breathe memories of childhood and mother's garden are shown to the best advantage with a setting of green. While it is not always possible to give the garden the style of background referred to, you can at least use some of your favorite shrubs in its composition, and the addition of a few hemlocks and pines will work wonders. Imagine a bed of tritomas running into a clump of hemlock, dahlias red or yellow against the young white pine.

Delphiniums, phlox, pentstemons are not only shown to better advantage when partly screened with green, but your garden is not in full view, and as you wander among the winding grass paths you are continually finding little surprises — a group of foxgloves sweet williams, aquilegias, forget-me-nots, that appear without any set design, as if they had fallen from your basket and taken root.

We were fortunate in having about two dozen cedars that were condemned in the clearing of one of the pastures. They were

shifted with frozen balls and planted either side of the garden gate. The common barberries were planted between them in the spring and *Anemone japonica* through the whole bed. While the native cedar is not the easiest tree to transplant from the hillside in spring, we have not yet had a single loss from the several score transplanted during winter, many of them 15 to 20 feet in height.

Should there be on your estate any cedars, dogwood, pines, or other trees that have to be removed in the clearing of pastures, etc. spare the axe until you are sure you do not need them elsewhere. If of medium size I would advise transplanting them to the nursery ground. A good start with your own material can be made by doing this. My reason for advising the planting of them in the nursery is that you will have trees the following year to plant wherever you want them. Let any losses that are likely to occur happen in the nursery rather than in the garden, or perhaps by your front door.

Sprawling Garden.

Another style of garden that is very attractive is the semi-wild or sprawling garden, where there is a rocky piece of ground that you do not wish to clear and has perhaps some cedars, birch, or other native growth upon it. *Clematis montana rubens*, for an early flowering vine, is ideal for this, and *Clematis paniculata* for the fall. The Dawson rose, with its half-sprawling habit, *Rosa setigera, blanda*, and *spinosissima;* the memorial rose as a ground cover; Ampelopsis or Virginia creeper partly over the rocks and finding its way up a cedar here and there, giving a natural effect and a riot of color in fall. *Celastrus scandens* and Asclepias are fine. Here is where the Michaelmas daisies are at home, and when seen in combination with golden rod and surrounded with the glorious autumn foliage of the dogwood, rock maple, etc., and the hanging drapery of the vines, there is created a picture that only nature can produce.

The native lilies, foxgloves, honeysuckles, and many other plants and shrubs, such as mountain laurel and Comptonias give a variety of flower and foliage, and above all a natural effect. No matter what kind of an estate you have there is a garden to fit into it.

It may be well to call your attention to some of the beautiful and interesting acquisitions for the garden recently brought to us from China.

For the sprawling garden *Ampelopsis Henryana, Ampelopsis aconitifolius discolor,* and the lovely *Schizophragma integrifolia, Clematis Armandi* and *montana rubens* are superb.

For the flower garden try *Hypericum patulatum* var. *Henryi* and *Lilium Sargentiae* and *myriophyllum.* If you want to add something really worth while in the setting of your garden plant *Eucommia ulmoides, Deutzia longifolia, Philadelphus incanus,* and the two spiraeas, Henryi and the variety Henryi notabilis.

Old-fashioned Garden.

This style of garden appeals to all, embracing as it does the old time flowers of European gardens with many of our native varieties. They form an ever changing variety of color and habit from early spring to late fall. By the use of bulbs and annuals there need be no bare places caused by the passing of the early varieties.

The Darwin and May-flowering tulips look at home when planted between perennials; place some between your delphiniums, phlox, hollyhocks, and peonies. The early foliage of the perennials makes an ideal setting for the tulips; *Gemeriana major* between anthemis is an example, or Clara Butt with the young light green foliage of delphiniums. Annual larkspurs fill the gap in a bed of *Anemone japonica* and gladioli are splendid between irises. Forget-me-nots and Japanese iris are a good combination; try narcissus with peonies; Catherine Duer dahlias with a background of dark leaved castor oil plants are glorious in fall. Pink petunias and white phlox go well together, as will white verbena and pink phlox, montbretias, and *Heuchera sanguinea.* The former flowers when the latter is done. For utility and as a means of floral education, the old-fashioned garden has a charm of its own, with its memories of other days.

Water Garden.

The estate owner that is fortunate enough to possess a lake or stream can add features both interesting and useful. The weeping

willow, planted to meet the water's edge, and as a background for nelumbiums and water lilies forms a picture charming and natural. The Japanese, Spanish, and many others of the iris family are at home in the moist places, while forget-me-nots, cardinal flowers, spireas, loosestrife, etc. revel in such surroundings. The elder planted in groups, or as single specimens here and there, breaks the outline of the water's edge. The giant mallows, one of the best introductions for many years, are especially fine for this style of planting, and if placed among hemlock and birch they are shown to the best advantage. The sweet clethra enjoys a moist place, as also does the American holly. Add to the above the various cornuses, their brightly colored stems are a feature of the winter landscape; allied with pines they are doubly effective.

The eupatoriums, marsh marigold, *Eulalia gracillima* (plume-grass) all aid in their own peculiar styles in making the water garden a thing of beauty and a place to find continual interest in nature's book of knowledge.

Transplanting Large Trees.

In regard to the shifting of large trees, we will suppose you have some on the estate you would like to transplant. The best method I know of and which I have found successful is this: Open a trench several feet from the stem of the tree, and with spading forks comb out the roots, working to the trunk of the tree from the trench; cut back the thick roots and save as many as possible of the fibrous roots; tie these in small bunches and lay back on the ball so as to be out of the way; the size of the ball will depend on the tree. When you have finished the digging lay the roots back, around the ball of earth remaining and cover them with leaves; this will prevent their drying out. Make a small sloping runway on the best side to take the tree out and leave the tree there till it is well frozen. If it is only of medium size you can tip it over on one side, place a stone boat under it and let the tree back. If there are no wires or other trees to go under, it can be taken standing upright; if there is snow one team can take quite a large tree.

This is an excellent way to shift large maples, elms, and also evergreens. If they are very large you would have to use a tree

moving machine. This takes a great deal more time; when you can use a stone boat do so. They are easy to load and unload. We have a boat made one board wider than the usual, and find that by having a large staple in either end one can be drawn right into the hole where the tree is going, then pull the tree over on one side, reverse your team, if needed, and pull the boat out.

Take the precaution to cover the place where you are planting the tree before the ground freezes. Do not dig out the soil till the tree is coming along, and then you will have good soil to fill in with again; guy the tree firmly. This is interesting and healthful work as it has to be done in severe weather, and it is surprising how smartly the men go about it; they have to; "there's a reason" if its down to zero.

Reclaiming Pasture Land.

You will probably find the pasture land in a more or less run down condition. Save what appears to be best and fertilize that for your hay crop. Plough up sections of the balance and use the disc harrow both ways. Plant to corn or potatoes, either crop needs intensive cultivation. While doing this you are clearing your ground of weeds to some extent, improving the soil, and getting some returns the first year. A good idea is to follow your corn with a green crop, such as rye or clover; that will save washing during winter and can be ploughed under in the spring. Follow with potatoes. The rye or clover can be sown between the rows of corn after the last cultivating; it will then have a good start for winter.

I am a firm believer in green crops as manure. Another thing they help to smother many weeds. My chief reason for cropping the ground two seasons is this; you will be destroying a lot of weeds, the seeds of which were turned under the first season and on the ground being turned up again, they have favorable conditions to grow.

Clean your ground well before putting down to grass, and you will be repaid many times over. You will be making two blades of grass grow where probably one grew before. The same applies to your lawns; give them a good start. We have got past the stage when we thought a crop of buckwheat or clover was unsightly, or

even potatoes. There is sure to be a crop of weeds spring up no matter how careful you are in the preparation of the lawn in its initial stage. The latter end of August is a good time to sow down a lawn; there is moisture at night even though the days are dry. If you have your lawn well graded in the spring there is a great temptation to sow it.

I would advise letting the first lot of weeds germinate, then go over it with push hoes, on a bright day; then sow it to crimson clover or buckwheat. The former has a little better appearance probably, if you are anxious to have the place looking green, and can be turned under a week or two previous to sowing the grass seed, giving the ground time to settle and also improving its texture.

Procure the best lawn seed you can buy from a reliable firm, as a bargain sale in grass seed is a delusion. To sum up, any extra labor or time given to the most important setting of your home, will repay you in the satisfaction of having a good lawn.

I have endeavored, in as plain a manner as possible, to give you the benefit of my life-time experience in the making of and caring for a country estate. I sincerely hope that some of my advice may prove profitable to any one contemplating a similar proposition. After all, experience is the best teacher, and by comparing our experience with one another much knowledge can be gained.

84.079
M4
H8t
Apr 23 1914

TRANSACTIONS

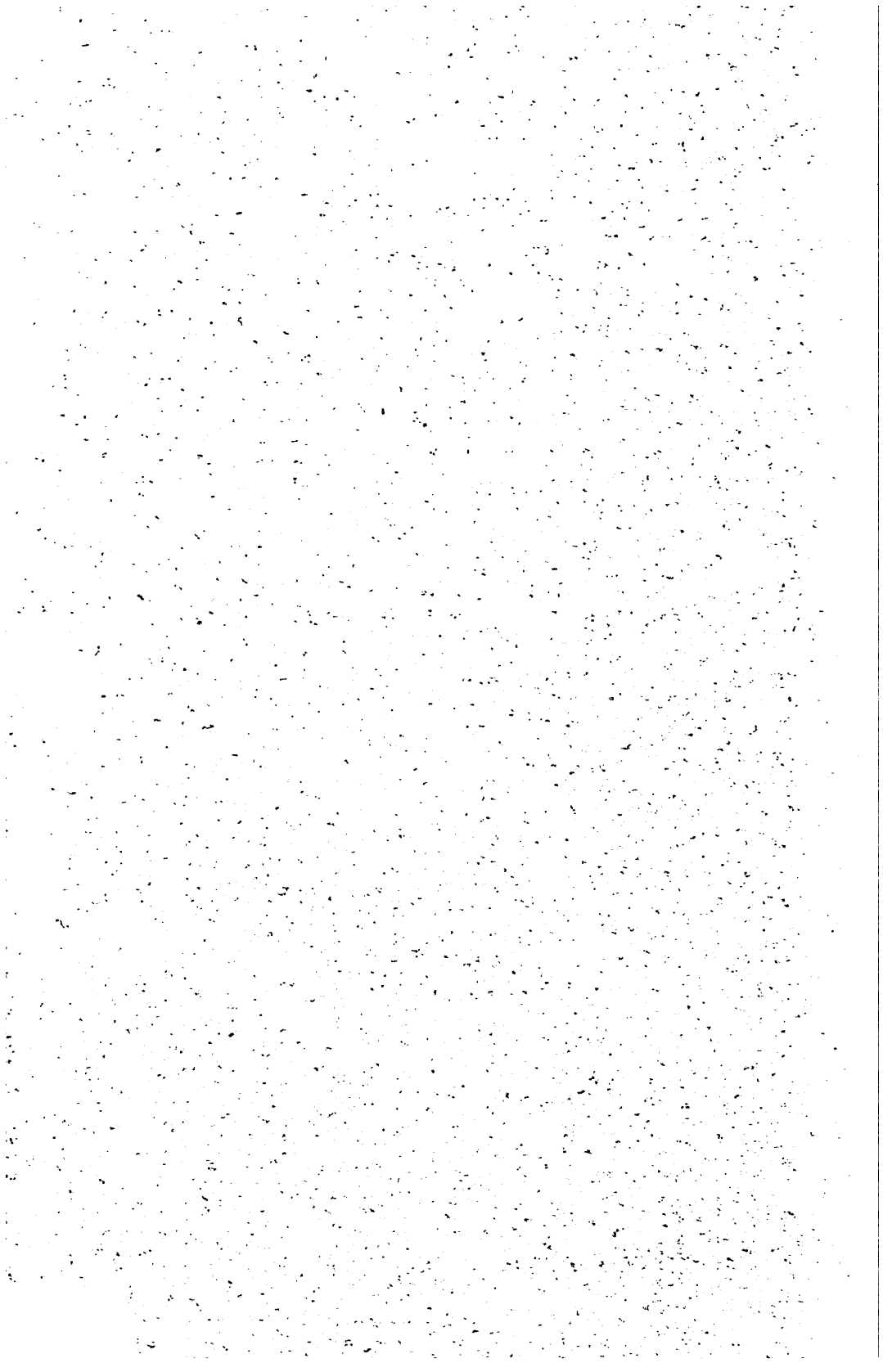
OF THE

MASSACHUSETTS HORTICULTURAL SOCIETY

FOR THE YEAR 1913

PART II

PUBLISHED BY THE SOCIETY
BOSTON
NINETEEN HUNDRED AND FOURTEEN



TRANSACTIONS

OF THE

Massachusetts Horticultural Society

FOR THE YEAR 1913

PART II

BOSTON
PRINTED FOR THE SOCIETY
NINETEEN HUNDRED AND FOURTEEN

MASSACHUSETTS HORTICULTURAL SOCIETY

1913

The Transactions of the Society are issued annually in two parts under the direction of the Committee on Lectures and Publications.

Communications relating to the objects of the Society, its publications, exhibitions, and membership, may be addressed to William P. Rich, Secretary, Horticultural Hall, No. 300 Massachusetts Avenue, Boston, Massachusetts.

WILFRID WHEELER, *Chairman*	*Committee on Lectures and Publications*
GEORGE B. DORR	
PROF. F. C. SEARS	

CONTENTS

ANNUAL REPORTS FOR THE YEAR 1913

Report of the Board of Trustees 139

Report of the Committee on Prizes and Exhibitions . 147

Report of the Committee on Plants and Flowers . 151

Report of the Committee on Fruits 185

Report of the Committee on Vegetables . . . 211

Report of the Committee on Gardens 223

Report of the Committee on Children's Gardens . . 235

Report of the Committee on Lectures and Publications 243

Report of the Delegate to the State Board of Agriculture 247

Report of the Secretary and Librarian . . . 253

Report of the Treasurer 255

THE ANNUAL MEETING, NOVEMBER 15, 1913 . . . 263

NECROLOGY, 1913 267

OFFICERS, COMMITTEES, AND MEMBERS, 1913 . . . 275

ANNUAL REPORTS FOR THE YEAR 1913.

HYDRANGEA SARGENTIANA (WILSON). EXHIBITED BY BAYARD THAYER. SEE P. 155

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

1913, PART II.

REPORT OF THE BOARD OF TRUSTEES FOR THE YEAR 1913.

The Board of Trustees of the Massachusetts Horticultural Society, in accordance with the requirement of the By-laws, presents herewith its annual report for the year 1913.

Four meetings of the Board have been held with an average attendance of nine members.

January 4. It was voted to appoint Mr. Walter Hunnewell Treasurer of the Society for the current year and Mr William P. Rich Secretary, Librarian, and Superintendent of the Building.

A communication from Mr. Michael H. Walsh was presented expressing his thanks for the award of the George Robert White Medal of Honor for the year 1912; also one from Mr. C. Harman Payne accepting with pleasure his election as a Corresponding Member of the Society.

On motion of Mr. Kidder it was voted to invite the New England Dahlia Society to hold its annual September exhibition in connection with the Dahlia Exhibition of the Massachusetts Horticultural Society.

Mr. Allen, chairman of the special committee appointed at the last meeting of the Board to consider the matter of changing the color of the walls of the large exhibition hall, reported several esti-

mates of the cost of the work both by plastering and painting. After some discussion it was voted that the same committee be continued for further study of the subject.

It was voted that the President and Superintendent of the Building constitute a committee with authority to install new boilers in the Society's building during the coming summer, should it be necessary to do so, the contracts for the work to be approved by the Finance Committee.

The same committee was also authorized to obtain estimates of the cost of changing the electric lighting system in the building.

President Farquhar spoke on the subject of the National Flower Show to be held in New York City in April. He said that a number of visitors from abroad was expected, among them several experts in horticultural matters.

On motion of Mr. Wheeler it was voted that the Committee on Lectures be authorized to expend from the Theodore Lyman Fund, No. 2, an amount sufficient to cover the expense of one or more lectures by these experts to be given at Horticultural Hall, Boston.

The President referred also to the proposed National Flower Show in Boston in 1914 and said that the City of Boston would furnish grounds in the Fenway for such an exhibition and otherwise coöperate to make the occasion a notable one.

On motion of Mr. Roland it was voted that the Society invite the Society of American Florists to hold its annual meeting and exhibition in Boston in 1914.

On motion of Mr. Wheeler it was voted to invite the Boston Market Gardeners' Association to hold its monthly meetings in Horticultural Hall on such days as can be arranged, subject to the expense of lighting and service.

On motion of Mr. Kidder it was voted to appoint Mr. Wilfrid Wheeler as Chairman of the Committee on Lectures and Publications to fill a vacancy existing in the chairmanship of that committee.

March 29. A communication from Professor Hugo de Vries of the University of Amsterdam was read expressing his most cordial thanks for the honor of election to corresponding membership in the Society.

A communication from Mr. Harry F. Hall was presented containing his resignation as a member of the Board on account of having taken up a permanent residence outside of New England.

The resignation of Mr. Hall as a Trustee was accepted and on motion of General Weld Mr. F. Lothrop Ames of North Easton was elected to fill the vacancy.

A vote of the Society, passed at the Inaugural Meeting held January 11, was read recommending to the Board that a committee be appointed to procure the portraits of the three recent Presidents of the Society.

On motion of Mr. Kidder it was voted that a committee of three be appointed to attend to the matter and the President appointed as this committee Messrs. Hunnewell, Weld, and Allen.

The following recommendations from the Committee on Prizes and Exhibitions were presented:

1. To recommend to the Board an appropriation of $6000.00 in addition to the income of the special prize funds of the Society for prizes and gratuities for the year 1914.

2. To recommend the appointment of a special committee consisting of the chairman of the Prize and Exhibition, the Plant and Flower, the Fruit, and the Vegetable committees, and the Secretary of the Society to represent the Society at the National Flower Show to be held in New York in April next, and also for the purpose of gaining information that may be of value in the management of horticultural exhibitions; the expenses of this committee to be paid by the Society.

On motion of General Weld it was voted that an appropriation of $6000.00, in addition to the income of the special prize funds of the Society, be authorized for prizes and gratuities for the year 1914; and on motion of Mr. Saltonstall it was voted to appoint the persons mentioned in the second recommendation of the Committee on Prizes and Exhibitions a committee to represent the Society at the National Flower Show in New York without expense to the Society.

It was further voted, on motion of Mr. Saltonstall, that the President and Treasurer be authorized to fill any vacancy that may exist in this committee.

Mr. Saltonstall called attention to the matter of the income from

the Mount Auburn Cemetery and said that this income, or a certain portion of it, should be treated as principal and added to the permanent funds of the Society.

On motion of General Weld it was voted that fifty per cent of the income from Mount Auburn Cemetery be hereafter added to the permanent funds of the Society.

October 4. Mr. Saltonstall, the special committee appointed October 5, 1912, to take steps to protect the Society's interest in the sidewalk adjoining its building on Huntington Avenue, presented the necessary legal papers and the following vote was passed:

Voted.— That the Massachusetts Horticultural Society shall give public notice, as provided by chapter 130 of the Revised Laws, to prevent the acquiring of a right of way or other easement over a strip of land fifteen (15) feet in width adjoining the building of the Society on Huntington Avenue, and over which strip of land there is a building restriction or setback; and that the notice to be given shall be signed on behalf of the Massachusetts Horticultural Society by Richard M. Saltonstall its Vice President.

The Schedule of Prizes and Exhibitions for the year 1914 was presented by the Committee on Prizes and Exhibitions and duly approved.

On motion of Mr. Saltonstall it was voted that a special committee be appointed, consisting of the President and Messrs. Downs and Roland, to consider the matter of the enforcement of the rules of the Schedule and to report on what further safeguard should be adopted to ensure the proper distribution of prizes.

A communication from Prof. W. F. Harris of Cambridge was read suggesting the appointment of a committee to consider and report upon the advisability of public instruction in gardening under the direction of the Society. The subject was discussed by several members and, on motion of Mr. Saltonstall, it was voted to appoint the President and Messrs. Kidder and Wheeler as this committee.

On motion of Mr. Wheeler it was voted to appoint Messrs. Saltonstall, Roland, and Wilder a special committee to report at the next meeting a list of candidates for the various standing committees of the Society for the ensuing year.

In accordance with the provisions of the By-laws it was voted to transfer the names of Joseph S. Chase and Frank S. Collins to the life membership list of the Society.

The resignation of Mr. Wilfrid Wheeler as the Society's Delegate to the State Board of Agriculture was presented and on motion of Mr. Downs was accepted with regret.

On motion of Mr. Downs it was voted to appoint Mr. Nathaniel T. Kidder as the Delegate of the Society to the State Board of Agriculture for the remainder of the current year.

On motion of Mr. Saltonstall it was voted to invite the American Peony Society to hold its next annual meeting in Horticultural Hall, Boston, in June, 1914.

Mr. Wilder called attention to the Biennial Session of the American Pomological Society to be held in Washington, November next, and suggested the appointment of a committee to represent the Society on that occasion. On motion of Mr. Saltonstall it was voted to appoint Mr. Wilder as one of the committee with the addition of such other members of the Society as may attend the convention.

December 27. It was voted to appoint Walter Hunnewell Treasurer of the Society and William P. Rich Secretary, Librarian, and Superintendent of the Building for the year 1914.

Appropriations for the ensuing year were voted as follow:

For the library, $400.00.

For library catalogue, $250.00.

For lectures in 1915, $460.00 in addition to the income of the John Lewis Russell Fund.

For Superintendent of Exhibitions, $250.00.

For Committee on Gardens, $300.00 for expenses and awards.

The Treasurer made a statement concerning the financial condition of the Society showing a considerable deficit for the current year, as compared with the previous year.

On motion of Mr. Kidder it was voted to dispense with the services of a publicity agent during the coming year.

The special committee appointed at the previous meeting to consider the matter of enforcing the rules of the Schedule reported through Mr. Downs the following recommendation: That Article 1 of the General Rules and Regulations be changed to read,

1. All exhibits and renewals must be ready for examination by the Committees at twelve o'clock on the day of the exhibition or they will not be considered by the judges.

It was voted that the recommendation of the committee be approved and referred to the Committee on Prizes and Exhibitions for adoption.

On motion of Prof. Sargent it was voted that no money awards be made hereafter on other than scheduled exhibition days.

It was voted also, on motion of Prof. Sargent, that a special committee be appointed to investigate the matter of the distribution of press and complimentary tickets at the exhibitions of the Society. The President appointed as this committee Messrs. Wheeler, Downs, and the Secretary.

The special committee on public instruction in gardening reported through its chairman, Mr. Farquhar, suggesting that four field days be held during the ensuing year. It was voted to refer the report back to the committee with full power in the matter.

On motion of Prof. Sargent, chairman of the special committee on the award of the George Robert White Medal of Honor for the year 1913, it was voted that the medal be awarded to the Park Commission of the City of Rochester, New York.

Prof. Sargent stated that the award was made in recognition of its successful efforts in establishing one of the most important collections of trees in America, in increasing the love of plants and of horticulture among the people of Rochester, and in exploring the flora of western New York and of adjacent regions.

Mr. Wilder reported upon the recent convention in Washington of the American Pomological Society, stating that the display of fruits from Massachusetts made an exceedingly creditable exhibit.

It was voted, on motion of Mr. Kidder, that hereafter the offerings of prizes in the Schedule of Prizes and Exhibitions shall not exceed ten per cent more than the appropriations voted by the Board of Trustees.

The report of the special committee on nomination of standing committees of the Society for the year 1914 was presented in writing by the chairman, Mr. Saltonstall, as follows:

Report of Committee on Nominations.

Committees for 1914.

Finance:— Walter Hunnewell, Chairman, Arthur F. Estabrook, Stephen M. Weld.

Membership:— J. K. M. L. Farquhar, Walter Hunnewell, Richard M. Saltonstall.

Library:— Charles S. Sargent, Chairman, Ernest B. Dane, George B. Dorr, Charles S. Minot.

Lectures and Publications:— Wilfrid Wheeler, Chairman, George B. Dorr, F. C. Sears.

Prizes and Exhibitions:— James Wheeler, Chairman, Duncan Finlayson, Peter Fisher, S. J. Goddard, T. D. Hatfield, Dr. W. G. Kendall, Alexander Montgomery, Edward B. Wilder.

Plants and Flowers:— T. D. Hatfield, Chairman, Arthur H. Fewkes, Donald McKenzie, James Marlborough, William Nicholson, William Sim.

Fruits:— Edward B. Wilder, Chairman, William Downs, Harold L. Frost.

Vegetables:— Duncan Finlayson, Chairman, William N. Craig, Henry M. Howard.

Gardens and Greenhouses:— J. K. M. L. Farquhar, Chairman, Robert Cameron, David R. Craig, Jackson T. Dawson, Arthur H. Fewkes, T. D. Hatfield, Richard Hittinger, Dr. Harris Kennedy, William Nicholson, Thomas Roland, Charles Sander, Wilfrid Wheeler.

Children's Gardens:— Henry S. Adams, Chairman, Mrs. Augustus Hemenway, Harry S. Rand, Miss Margaret A. Rand, William P. Rich, James Wheeler.

On motion of Mr. Allen the report of the committee on nominations was accepted and approved.

William P. Rich,
Secretary.

REPORT OF THE COMMITTEE ON PRIZES AND EXHIBITIONS FOR THE YEAR 1913.

By James Wheeler, Chairman.

During the year 1913 thirteen exhibitions were held by the Society.

The Midwinter Exhibition, February 1–2, of primulas, begonias, orchids, roses, carnations, sweet peas, fruit, and vegetables was extra good. The competition was keen and the quality of the exhibits above the average. The display of carnations filled the center of the large hall and the exhibit of sweet peas was noteworthy. The show was well attended.

The Spring Show, March 14–16, was a great success filling the three halls. The exhibit of cyclamen showed high cultivation, and narcissi were shown in large quantity and of extra good quality. There was a good display of orchids and we were pleased to see competition in cut roses which has been absent from our exhibitions so long. Carnations were again well shown as were sweet peas. The table decorations were well contested and very interesting as well as instructive to the visitors.

The May Exhibition, May 17–18, filled the large hall. Messrs. R. & J. Farquhar & Co. made a magnificent display of Darwin tulips. The show was well attended.

The Rhododendron Show, June 7–8, brought out a fine display of herbaceous flowers. There were not as many rhododendrons shown as usual but the quality was good as was also the attendance.

Your committee put the Peony Show one week before the Rose and Strawberry Show which date was satisfactory in bringing out a large display. The Messrs. Farquhar made a splendid exhibit of peonies filling one-third of the large hall. This show was well attended.

The Rose and Strawberry Show, June 21–22, brought out a

great many exhibitors. The amateur classes were well contested and the quality of the flowers and fruit was good. Some very fine Hybrid Tea roses were shown. The display of strawberries was good, also the vegetables.

The Sweet Pea Exhibition was held in connection with the convention of the American Sweet Pea Society, July 12–13. Great interest was manifested in this exhibition as the sweet pea is everybody's flower. The three halls were taxed to their utmost and the attendance was large. Some classes had nineteen competitors.

The Gladiolus and Phlox Exhibition, August 9–10, surpassed all previous exhibits of these decorative flowers. The gladioli were artistically arranged in various receptacles by Mr. and Mrs. B. Hammond Tracy showing the public how to use these flowers for home decoration.

The Exhibition of the Products of Children's Gardens held August 30–31 was a great success. It filled the large hall and the quality and arrangement were splendid. It certainly shows that the exhibitions of the future are assured by the interest and the enthusiasm displayed by the children.

The Dahlia and Fruit Show, September 12–14, was successful in bringing out strong competition in all the classes. The exhibits of peaches were very fine.

The Vegetable Exhibition, October 4–5, brought out a large display filling two halls.

The Chrysanthemum Show, October 30–November 2, displayed fine groups of foliage plants and orchids but was lacking in large specimens and in table decorations.

The Special Fruit Exhibition, November 12–16, filled the three halls. It does not seem possible to surpass the quality of fruit shown.

All the free exhibitions and the Spring Show were well attended but there was a lack of interest in the Chrysanthemum and Special Fruit shows.

Your committee wishes to thank Messrs. R. & J. Farquhar & Co. for their large and instructive displays of plants brought in to the exhibitions during the year, not entering into competition nor receiving any gratuities.

The Schedule of Prizes and Exhibitions for the year 1914 provides the usual exhibitions and was issued in September.

JAMES WHEELER
DUNCAN FINLAYSON
S. J. GODDARD
T. D. HATFIELD
DR. W. G. KENDALL
ALEXANDER MONTGOMERY
EDWARD B. WILDER

Committee on Prizes and Exhibitions.

REPORT OF THE COMMITTEE ON PLANTS AND FLOWERS FOR THE YEAR 1913.

By T. D. Hatfield, Chairman.

There has been some improvement in the shows for the year 1913. The arrangement from a decorative point of view has been better and competition keener.

January 11 George McWilliam of Whitinsville exhibited a new hybrid Calanthe, *C. Lasselliana*, (*C. oculata gigantea* × *C. McWilliami*), white with a maroon eye. It is a large flowered, handsome hybrid and a Silver Medal was awarded it.

E. B. Dane showed *Cypripedium Boltonianum*, almost pure white and of unknown parentage, probably *C. niveum* type. It was awarded a First Class Certificate.

Midwinter Exhibition.

The Midwinter Show, February 12, was the best we have had in many years. The standard was high and competition close.

The new Primula (*P. malacoides*) has suddenly jumped into favor and has proved an acquisition for winter decorations. It is a free bloomer, easily grown, and its color is a charming shade of lavender. The groups of this plant shown by Mrs. Frederick Ayer and Mrs. C. G. Weld were equally good, and the plants of Begonia Gloire de Lorraine shown by Mrs. Weld were of a high order of merit.

Hard-wooded plants were not up to the standard. Apparently they are not in favor and those who exhibited evidently were hard pressed for plants to fill out the Schedule decently. The specimens of *Acacia pubescens* and *Chorizema Lowii* from Mrs. J. L. Gardner, however, deserve special notice, and the Freesias from Mrs. Weld and William Whitman were excellent.

Good orchids were lacking; the prizes offered for them should have brought out more displays and better competition.

The carnation growers were out in force and they put up some excellent blooms. A. A. Pembroke of Beverly carried off most of the first prizes. The best dark pink was Rosette; light pink, Gloriosa; red, Beacon; variegated, Benora; white, White Wonder.

Knight and Struck of New York showed a neat lot of commercial hard-wooded plants; Mrs. Frederick Ayer had four splendid specimens of *Erica melanthera*, a perfect sheet of bloom; H. Huebner of Groton showed his new winter flowering snapdragons; William Sim, some fine pansies; Mrs. Lester Leland, some excellent specimens of *Cyclamen persica superbum;* Mrs. E. M. Gill, seasonable flowers; and Jackson Dawson, sprays of *Hamamelis japonica*, a charming yellow-flowered witch hazel.

March 8 Walter Hunnewell showed a new Cattleya, C. Wellesley, (*C. Percivaliana* × *Laelio-Cattleya Martinetii*); sepals and petals mauve, lip maroon, throat deep yellow.

Spring Exhibition.

One of the special features of the Spring Show, held March 14–16, was Prof. Sargent's display of *Azalea hinodigera* hybrids which was awarded a Silver Medal. *Azalea hinodigera* had been crossed by a small white-flowered variety named *romantiaca*, and a small-flowered seedling raised on the estate named Garnet. The result was shades of rose-pink, red, salmon, and delicately tinted salmon-pink. These hybrids force well and promise to be exceedingly useful for florists' work.

Mrs. Lester Leland's Cyclamens were extra good.

Duncan Finlayson put up an effective group of foliage and flowering plants in the center of the main hall, made up of palms, ferns, rhododendrons, azaleas, acacias, ericas, primulas, coronillas, narcissi and other spring flowering bulbs.

Mrs. John L. Gardner's general display of spring-flowering bulbs was effectively staged and included narcissi, crocuses, tulips, Easter lilies, callas, grape hyacinths, oxalis, squills, Hippeastrums, and *Asparagus elongatus*.

R. & J. Farquhar & Co. showed a grand lot of commercial Cyclamens which was awarded a Silver Medal.

Another feature of the show was a group of twenty specimen plants of *Erica melanthera* from Walter Hunnewell for which a Silver Medal was awarded.

A Silver Medal was awarded E. B. Dane for hybrid orchid Rowena (*Brassavola Digbyana* × *Laelio-Cattleya* Doris.

Mrs. Frederick Ayer had some fine specimen heaths and several acacias. The species of acacia were *Acacia verticillata, A. cordata, A. Riceana, A. hybrida, A. pulchella,* and *A. armata.*

Mrs. C. G. Weld showed a neat group of orchids, with *Dendrobium Wardianum, D. nobile, D. Ballinianum, D. virginale,* and *D. Cooksonii,* set off with palms, ferns, and grasses.

The Waban Rose Conservatories displayed their new rose the Mrs. Charles Russell, also the Killarney. William H. Elliott showed a collection of roses including the Killarney, white and pink, the Richmond, Lady Hillingdon, and the new pink rose Mrs. W. D. Miller.

James Wheeler of Natick and F. W. Fletcher of Auburndale showed well-grown Antirrhinums; Strout's of Biddeford, Maine, had carnations Winsor, Benora, Gloriosa, White Enchantress, Pink Delight, Melody, and Beacon; A. W. Pembroke of Beverly had carnations Gloriosa, White Wonder, and Rosette.

Scott Brothers of Elmsford, New York, were awarded Honorable Mention for their new scarlet carnation William Eccles, and S. J. Goddard Honorable Mention for a seedling crimson carnation. Patten & Co. of Tewksbury had an artistically arranged vase of their new crimson carnation, Princess Dagmar.

The Cottage Gardens of Queens, New York, were awarded a First Class Certificate for a new white carnation named Matchless, a variety of great promise.

Mrs. E. M. Gill had a neat display of cut flowers and Miss Marian Roby Case of Weston sent some forced *Hepatica triloba.* William Sim was awarded a First Class Certificate for a collection of sweet peas, including Florence Denzer, white; Wallacei, lavender; W. H. Smalley, cream pink; and Christmas Pink.

Peter Fisher sent his new carnation Gorgeous and W. A. Manda a crested form of *Nephrolepis tuberosa* which should prove a valuable plant for decorative work.

May Exhibition.

Competition was poor at the exhibition of May 17. R. & J. Farquhar & Co. had some neat specimens of *Clematis montana rubens* in bloom. They also showed the new tufted pansy, *Viola cornuta*, var. *atropurpurea*, which promises to be a useful plant for bedding, cut flowers, and border work. The Messrs. Farquhar were awarded a Bronze Medal for a collection of May-flowering tulips. Some of the best of these were Baron Tounay, old-rose-pink; La Reve, pale pink; Moonlight, pale yellow; Summer Beauty, pink and white; and Scarlet Emperor.

Walter Hunnewell showed Wilson's re-collected *Azalea sinensis*, a pure yellow-flowered species. Francis Skinner of Dedham also had an excellent lot of tulips and Thomas T. Watt of Wellesley sent a fine plant of *Oncidium Marshallianum*.

Mr. E. B. Dane's orchids included *Cattleya Mossiae*, var. *Reineckiana*, *C. Mendelii*, *Brasso-Cattleya Veitchii*, *Vanda tricolor*, and *Odontoglossum crispum*. Mrs. J. L. Gardner had an attractive display of winter-blooming gladioli, of the Bride type, and some orchids including *Cypripedium barbatum*, *Cattleya Mossiae*, *Laelia purpurata*, var. *Schroederi* × *Cattleya gigas*, a handsome bi-generic hybrid.

William Whitman had *Iris florentina* and cut Pelargoniums. George F. Stewart of Medford was awarded a First Class Certificate for a bronze-colored variety of *Calceolaria Stewartii*.

June Exhibitions.

At the exhibition of June 7 rhododendrons were of excellent quality and were staged in quantity by Walter Hunnewell and Francis Skinner. Nothing new appeared among the varieties shown.

R. &. J. Farquhar & Co. displayed herbaceous flowers including Dianthus, Pyrethrums, Delphiniums, Lychnis, Hemerocallis in variety, *Achillea tomentosa*, *Iberis sempervirens*, *Campanula glomerata*, *Helenium Hoopesii*, peonies, lupines, veronicas, and spiraeas.

The Mount Desert Nurseries had some German irises of very distinct coloring and some new Trollius of both European and Asiatic types. In the future we are promised some very interesting and beautiful varieties of these globe flowers. The Messrs. Farquhar made a very pretty display of *Paeonia officinalis* varieties.

F. J. Rea's herbaceous flowers included *Phlox divaricata*, var. *Laphami*, a pretty light-blue flowered variety, Aquilegias, Trollius, poppies, and some Hemerocallis hybrids. The Blue Hills Nurseries showed herbaceous flowers; among them *Amsonia Tabernaemontana, Dictamnus caucasicus, Baptisia australis, Ranunculus speciosa,* Hemerocallis Dr. Regel, a deep orange-yellow variety, *Iris sibirica* Snow Queen, and Pyrethrum Lord Roseberry.

Honorable Mention was awarded Bayard Thayer of South Lancaster for a specimen plant of *Hydrangea Sargentiana* (Wilson). It is a remarkable species, with large, velvety, heart-shaped leaves, a foot or more in diameter. The inflorescence is umbellate, composed mainly of blue fertile flowers. The rays form a scattered margin of white flowers which from a decorative point of view would be better wanting.

J. T. Butterworth had a fine specimen of *Miltonia vexillaria* and E. B. Dane showed Miltonias, Cattleyas, Masdevallias, Odontoglossums, Cypripediums, Brasso-Cattleyas, and *Dendrobium thrysoidea.* Mrs. J. L. Gardner's orchid display included *Cattleya Mossiae, Brassavola Digbyana,* and Aerides, all set off nicely with Panicum grass and foliage plants.

The Peony Show, June 14, was first rate and competition was keen. George H. Peterson of Fair Lawn, New Jersey, was the chief winner. He had marvelously fine flowers.

An interesting feature was the display made by R. & J. Farquhar & Co. of peonies artistically arranged in a series of bowers with a view to color contrast. All the different colors were massed separately and named. The beauty of the arrangement and its educational value were both emphasized. For this unique display the Messrs. Farquhar were awarded a Gold Medal.

E. J. Shaylor, as usual, had a very choice selection of new and recent varieties, otherwise there were few varieties calling for special awards.

Dr. Charles S. Minot was awarded Honorable Mention for a

collection of seedlings and the Mount Desert Nurseries got a First Class Certificate for seedling No. 213.

The Mount Desert Nurseries made a remarkable display of Eremuri, probably unequalled, for which they were awarded a Gold Medal.

The Old Town Nurseries and the Eastern Nurseries made seasonable displays of herbaceous flowers, and Mrs. Frederick Ayer had a pretty display of fuchsias. Prof. C. S. Sargent showed the new *Geum Bradshawii* for which he received a First Class Certificate. This promises to be an excellent pot plant for conservatory decoration.

To William Sim was awarded a Gold Medal for advancement in the culture and development of the sweet pea. He made a superb exhibit, including Barbara, orange-salmon; Dazzler, orange-scarlet; Freda, improved white Spencer; Elfrida Pearson, blush-pink; Hercules, shrimp-pink; Mrs. Hugh Dickson, cream-pink; and Edrom Beauty, orange-pink.

At the Rose Show, June 21, there was a goodly display of roses, though as a whole it was not up to the mark. Among amateurs Robert Seaver was the chief winner. Hybrid Teas of exceptional merit were shown by Albert Geiger of Brookline. His list included Lyon Rose, pink, shaded yellow; Mrs. Aaron Ward, yellow, salmon tinted; La Tosca, silvery pink; Col. Grant, pink; Mme. Kavaray, orange-yellow; Pharisaer, rosy white, salmon tinted; Dean Hole, silvery carmine; Florence Pemberton, creamy white, suffused pink; Gustave Grunerwald, carmine pink, yellow center; Kaiserin Augusta Victoria, white; Killarney, pink; and Mme. Leonpain, silvery salmon, orange center.

The table decorations made by Mrs. Peterson were most artistic. One of the attractive features of the show was a display of aquatics made by Robert Cameron of the Harvard Botanic Garden. Walter Hunnewell and the Weld Garden had displays of hardy flowers.

The Old Town Nurseries of South Natick won the Silver Medal for best display of hardy flowers and the Eastern Nurseries of Jamaica Plain and the Mount Desert Nurseries of Bar Harbor, Maine, also had exhibits of hardy flowers.

Walter Hunnewell was awarded a First Class Certificate for Laelio-Cattleya Rex (Laelio-Cattleya Amanda × Cattleya Rex).

Sweet Pea Exhibition.

The Massachusetts Horticultural Society on July 14 again held its Sweet Pea Show in conjunction with the annual exhibition of the American Sweet Pea Society. It was a tremendous success. Flowers came from Philadelphia on the south, Bar Harbor on the north, and all the intervening territory contributed.

The Society's classes were fully contested. Being limited to twenty-five blooms, comparison was easy, and the judgment might fairly be said to represent the decorative value of the variety the award went to. The opinion of the committee is that the Grandiflora type should be eliminated as it is now quite superseded by the Spencer.

For the John Allen French Fund the best white was Money Maker; crimson or scarlet, Scarlet Empress; rose or carmine, John Ingman; yellow, Dobbie's Cream; blue, Lord Nelson; blush, Mrs. Hardcastle Sykes; cream-pink, Doris Usher; deep pink, Hercules; cerise, Willie Maslin; orange, Thos. Stevenson; lavender Asta Ohn; purple, Tennant Spencer; mauve, Irish Belle; maroon or bronze, Brunette; picotee-edged, Eric Harvey; striped, maroon, red, or rose, May Campbell; striped, blue or purple, Senator Spencer.

It will be seen that entry for this fund is not limited to any type, but the varieties are almost wholly Spencers, among which were Etta Dyke, white; Florence Nightingale, lavender or blue; Thos. Stevenson, salmon or orange; George Washington, crimson or scarlet; Elfrida Pearson, light pink; and Countess Spencer, dark pink.

Among large exhibitors were R. & J. Farquhar & Co. of Boston and W. Atlee Burpee of Philadelphia. The Farquhar exhibit was a novelty in sweet pea decoration. It was a cross within a circle; paths leading through festooned arches with a fountain in the center. It took the first prize for artistic arrangement and effective staging.

W. Atlee Burpee exhibited some of the best sweet peas, especially as to varieties, ever seen here. He received the Sweet Pea Society's Gold Medal for the most meritorious exhibit and a Certificate of Merit for sweet pea Illuminator.

Other exhibitors were George W. Vanderbilt, Bar Harbor, Maine; W. B. Leeds, T. O. Richardson, Miss Fanny Foster, and T. J. Emery, all of Newport, Rhode Island; Mr. Heeremans of Lenox; A. W. Preston of Swampscott; Peter Fisher of Ellis; and the Mount Desert Nurseries of Bar Harbor.

The following named varieties occurred frequently, indicating well-merited popularity: Helen Lewis, Scarlet Emperor, Doris Usher, John Ingman, Vermilion Brilliant, White Spencer, Money Maker, Etta Dyke, George Herbert, and Primrose Spencer.

In the competition for the best table of sweet peas Duncan Finlayson was disqualified for using Gypsophila blossoms. Gypsophila is about the only thing to properly set off sweet peas and should be allowed.

The mantel decorations were well done. The first prize went to Wax Brothers. The feature was pink and white, prettily festooned with smilax and other greenery.

The Messrs. Farquhar made a large display of their new *Lilium myriophyllum* to which the Committee on Gardens later awarded a Gold Medal.

Dr. Harris Kennedy of Milton made an artistic display of Japanese irises; John Lewis Childs, a display of gladiolus; Mrs. Lester Leland, tuberous-rooted begonias; B. H. Tracy, gladiolus; Mount Desert Nurseries, *Lilium maculatum* (*L. Hansoni*); and Mrs. E. M. Gill a display of cut flowers.

The Gladiolus Exhibition, August 9.

Gladiolus blooms were exceptionally fine. This was remarkable considering the very dry and hot season we have had, and goes to show what a splendid dry weather plant the gladiolus is.

C. W. Browne of Ashland was the winner in the class for twelve best blooms. The exhibit made by Chamberlain & Gage of South Natick was remarkably good. This firm was awarded Honorable Mention for gladiolus Mrs. L. Merton Gage, white, shaded violet, and Gaiety, salmon-pink, deeper tinted.

B. Hammond Tracy of Wenham made an artistic display showing the various ways cut flowers of gladiolus could be used with

other decorative material. Honorable Mention was made of Mr. Tracy's Barbara, a salmon-red variety.

C. W. Brown was awarded a First Class Certificate for Mongolian Prince, a nearly pure yellow. The Old Town Nurseries made a most artistic display, using a delicate and graceful grass, *Uniola latifolia*, which showed its value in such decorations.

The Messrs. Farquhar were awarded a Gold Medal for *Lilium Sargentiae* which the committee had recently seen at their grounds in Roslindale. It is a vigorous grower, carrying eight to twelve white, widely campanulate flowers. It was collected in China by E. H. Wilson. This with *Lilium myriophyllum* fills in a wide gap among summer-blooming lilies, one flowering in July, the other in August. The Messrs. Farquhar were also awarded a Silver Medal for a magnificent display of *Lilium Henryi*.

A First Class Certificate was awarded Leonard W. Ross of the Cemetery Department of the City of Boston for a spotted yellow sport from canna King Humbert, named Miss Agnes Fitzgerald. The Mount Desert Nurseries made a display of hardy flowers, Aconitums being a feature, and Mrs. E. M. Gill had a display of cut flowers.

The Dahlia Show, September 12.

This was a very good show; there was a large display of dahlias and the quality was excellent. W. D. Hathaway of New Bedford was the principal winner of prizes. Other exhibitors were E. W. Ela of Woburn, J. K. Alexander of East Bridgewater, E. F. Dwyer of Lynn, and Sisson & Thurston of Newport, Rhode Island.

B. H. Tracy had an artistic display of gladiolus. The Silver Medal for the best display of herbaceous flowers was awarded to the Eastern Nurseries of Holliston. The Old Town Nurseries and the Mount Desert Nurseries had excellent displays of herbaceous flowers. F. J. Rea of Norwood and R. & J. Farquhar & Co. staged some handsome, perennial phloxes, and the Messrs. Farquhar and Mount Desert Nurseries showed the new *Buddleia variabilis* in various forms.

E. Allan Peirce of Waltham showed an elegant basket of the Cecile Brunner, a sweetly-scented Pompon rose, suitable for

decorative work, and Mrs. Frederick Ayer a handsome plant of *Dracaena Godseffiana*, well furnished with bright-red fruit, which attracted a good deal of attention.

At the Vegetable Show, October 4, the Messrs. Farquhar received a Vote of Thanks for a large and artistic display of dahlias which was exceptional considering the lateness of the season. They were awarded also a First Class Certificate for a white, single-flowered chrysanthemum from Korea. This, evidently, is near, if not the typical *Chrysanthemum sinense*. It is a hardy perennial and promises to be a good border plant.

The Chrysanthemum Show, October 31–November 2.

Chrysanthemum Shows are not what they used to be. At this show the materials for making an old time Chrysanthemum Show were lacking, that is, well-trained specimen plants and plenty of large blooms. In other respects, from a decorative point of view, the show was one of the best. Other material was in abundance and was well made use of. Taking the place, nowadays, of trained plants are mixed groups, comprising nearly all classes, blended with foliage plants for effect. In years past, when this was attempted, it usually could not be considered a pronounced success. Now, however, with the smaller flowered varieties in more general use, the opportunities are better. The display of Thomas E. Proctor of Topsfield was a notable example of what may be done in this direction and Walter Hunnewell's exhibit was along the same line.

Jason S. Bailey of West Roxbury took first prize for best four specimen plants with Louis Boehmer, Dr. Enguehard, Theo, and Mrs. Beckett. Thomas E. Proctor showed sixty-six varieties in his group which included all types. William H. Elliott's commercial plants were the best ever shown in this class. They were handsome, well-bloomed plants in seven and eight-inch pots without stakes. Col. H. E. Converse of Marion was the winner in the class for twenty-five blooms, and James Nicol of Quincy won the H. A. Gane Memorial Prize with some excellent blooms of Mrs. Jerome Jones.

There were large displays of single-flowered varieties and they stood up better than usual. Mrs. Sarah C. Sears of Southboro was awarded Honorable Mention for an exhibit of single varieties of merit.

Norris F. Comley of Lexington received a Silver Medal for his new, hardy, yellow-flowered variety named Terrace Hall. He made a very effective group, using autumn foliage as decorative material.

There were large collections of orchids and competition was keen. Mrs. J. L. Gardner was the first-prize winner with a well-finished group including Dendrobiums, Phalaenopsis, *Cypripedium insigne Sanderae*, and *C. Simmoni*, *Cattleya labiata* in variety, *Oncidium varicosum*, *Rogersii*, and *Phalaenopsis amabilis*. F. J. Dolansky's second-prize group was bright with *Cattleya labiata*.

The Arnold Arboretum made an instructive display of berried plants, including *Cornus racemosus* and *sanguineus*, *Euonymus radicans* and *vegetus*, *Ligustrum vulgare*, *Viburnum americanum*, *Symphoricarpus racemosus*, *Pyrus melanocarpa*, *Callicarpa japonica*, *Crataegus cordata*, *Lonicera Mackii*, *Myrica caroliniana*, *Ilex glabra*, *Cotoneaster horizontalis*, and *Rhamnus dahurica*.

A First Class Certificate was awarded Thomas E. Proctor for a specimen plant of *Adiantum Farleyense gloriosa* and a Silver Medal (cultural) to the gardener, James Marlborough, for superior culture. The foliage is smaller than the type and a darker green. It promises to be of easy growth and to come into general cultivation.

The Park Department of the City of Boston made a beautiful display of tropical plants and was awarded a Silver Medal together with a Vote of Thanks to Mayor Fitzgerald. The Breck-Robinson Co. had a neat group of evergreens interspersed with herbaceous and other flowers. Penn the Florist made a tasty exhibit of small-flowered chrysanthemums in baskets on a ground of purple velvet.

W. W. Edgar Co.'s and A. Leuthy's displays of commercial plants were very effective, and A. N. Pierson and C. H. Totty made attractive displays of chrysanthemums and roses. In Mr. Totty's group Lilian Doty, a pink tinted variety of the Chinese type showed up well and Fairy Queen, a rose colored variety was the best in Mr. Pierson's group.

Edward MacMulkin put up a decorative table of chrysanthemums with other foliage and flowering plants. Frank P. Putnam of North Tewksbury showed a handsome lot of some of the newer, single-flowered chrysanthemums. E. G. Hill of Richmond, Indiana, showed his new chrysanthemum Chieftain. It is a medium-sized commercial plant of a shell-pink color and was awarded a First Class Certificate.

December 6 Mrs. J. L. Gardner (William Thatcher, gardener) made a display of flowering plants in pots including *Aphelandra aurantiaca*, var. *Roezlii*, a pretty acanthaceous plant with orange-colored flowers.

December 27 a Silver Medal was awarded A. M. Davenport of Watertown for a very fine sport of Begonia Gloire de Lorraine, named the Florence Davenport. The flowers are as large as the variety known as Glory of Cincinnati, but much more profuse, and in every way a better grower and a more attractive plant.

On the same date F. J. Dolansky of Lynn was awarded Honorable Mention for a display of *Cattleya Trianae* and a Silver Medal for *Cattleya Trianae alba*. This is a very fine variety though not new. As it has never been recognized by the Society a Silver Medal was awarded.

There was another plant in the group which is generally known as *C. Trianae alba*. Though not less beautiful it is not so well deserving the name for it is considerably tinted and worthy a better designation than *C. Trianae alba*. Furthermore, as it comes from the same region as *Cattleya Mendelii* and has some of its characteristics it may be a natural hybrid.

T. D. Hatfield
Arthur H. Fewkes
Donald McKenzie
James Marlborough
William Nicholson
William Sim

Committee on Plants and Flowers.

PRIZES AND GRATUITIES AWARDED FOR PLANTS AND FLOWERS.

1913.

JANUARY 11.

Gratuity:—

Mrs. J. L. Gardner, collection of double, white *Primula sinensis*, $5.

MIDWINTER FLOWER SHOW.

FEBRUARY 1 AND 2.

PRIMULA SINENSIS.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, William Whitman, $6.

PRIMULA STELLATA.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, Mrs. J. L. Gardner, $6.

PRIMULA OBCONICA.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, William Whitman, $6.

PRIMULA MALACOIDES.— Eight plants in not less than six-inch pots:
1st, Mrs. Frederick Ayer, $8; 2d, Mrs. C. G. Weld, $6.

BEGONIA GLOIRE DE LORRAINE.— Six plants:
1st, Mrs. C. G. Weld, $10.

HARD-WOODED GREENHOUSE PLANTS.— Six specimens, in not less than three varieties, other than Azaleas:
1st, Mrs. J. L. Gardner, $12.

FREESIAS.— Six eight-inch pots or pans:
1st, Mrs. C. G. Weld, $6; 2d, William Whitman, $4.

ROMAN HYACINTHS.— White, eight six-inch pots or pans:
1st, William Whitman, $6; 2d, Mrs. J. L. Gardner, $4.

POLYANTHUS NARCISSUS.— Six eight-inch pots or pans:
1st, Mrs. J. L. Gardner, $6.

ORCHIDS.— Three plants in bloom:
1st, Mrs. J. L. Gardner, $10.

Specimen plant in bloom:
1st, Col. Charles Pfaff, $5; 2d, Mrs. J. L. Gardner, $4.

CARNATIONS.— Vase of fifty cut blooms, not less than five varieties, with foliage:
1st, S. J. Goddard, $8; 2d, M. A. Patten, $6; 3d, A. A. Pembroke, $4.

Vase of fifty cut blooms, not less than three varieties, open to private gardeners only:
1st, A. W. Preston, $8; 2d, Mrs. Frederick Ayer, $6; 3d, Mrs. Frederick Ayer, $4.

Fifty blooms, any white variety:
1st, A. A. Pembroke, $5; 2d, S. J. Goddard, $3; 3d, A. A. Pembroke, $2.
Fifty blooms, any red variety:
1st, M. A. Patten, $5; 2d, S. J. Goddard, $3.
Fifty blooms, any light pink variety:
1st, A. A. Pembroke, $5; 2d, S. J. Goddard, $3; 3d, S. J. Goddard, $2.
Fifty blooms, any dark pink variety:
1st, A. A. Pembroke, $5; 2d, S. J. Goddard, $3; 3d, W. D. Howard, $2.
Fifty blooms, any white variegated variety:
1st, A. A. Pembroke, $5; 2d, M. A. Patten, $3; 3d, S. J. Goddard, $2.
Fifty blooms, any other color:
1st, M. A. Patten, $5.

VIOLETS.— Bunch of one hundred blooms of any single variety:
1st, E. Bingham, $3.

Gratuities:—

E. B. Dane, display of *Acacia pubescens* and other plants, $15.
Mrs. Frederick Ayer, group of *Erica melanthera*, $10.
Mrs. C. G. Weld, display of Amaryllises, $5.
Mrs. J. L. Gardner, specimen *Chorizema Lowii*, $5.
Mrs. Lester Leland, display of *Cyclamen superba*, $5.
William Whitman, collection of Cyclamens, $10.
Mrs. G. A. Walker, *Dendrobium nobile*, grown in living room, $1.
William Whitman, display of pot plants, $5.
M. A. Patten, Carnation Princess Dagmar, $5.
W. D. Howard, Carnation Eureka, $3.
" " " salmon sport Winsor Carnation, $3.
S. J. Goddard, vase of crimson Carnations, $3.
H. Huebner, winter-flowering Snapdragons, $5.
William Sim, display of Pansies, $3.
Mrs. E. M. Gill, collection of cut flowers, $1.

SPRING EXHIBITION.

MARCH 14, 15, AND 16.

AZALEA INDICA.— Three plants, distinct varieties, not less than thirty-six inches in diameter, for private growers only:
1st, A. W. Preston, $12; 2d, William Whitman, $10.

PALMS.— Pair, in pots or tubs:
1st, Weld Garden, $12; 2d, Mrs. Frederick Ayer, $10; 3d, William Whitman, $8.

ERICAS.— Six plants, in not less than three species:
1st, Mrs. Frederick Ayer, $12.

ACACIAS.— Group of plants in bloom, to occupy one hundred square feet:
1st, Mrs. Frederick Ayer, $25.

Specimen plant in bloom:
1st, Weld Garden, $8; 2d, Weld Garden, $6.

HARD-WOODED GREENHOUSE PLANTS.— Six specimens, other than Acacias, Azaleas, and Ericas:
2d, Weld Garden, $10; 3d, Mrs. J. L. Gardner, $8.

GROUP OF ROSES.— Not less than twelve plants, all classes admissible, open to commercial growers only:
1st, W. W. Edgar Co., $40 and Silver Medal.

CYCLAMENS.— Twelve plants, in not over seven-inch pots:
1st, Mrs. C. G. Weld, $15; 2d, Weld Garden, $10; 3d, Mrs. J. L. Gardner, $6.

Six plants, in not over ten-inch pots:
1st, Mrs. Lester Leland, $25; 2d, Weld Garden, $15; 3d, Mrs. C. G. Weld, $10.

CINERARIAS.— Grandiflora type, six plants:
1st, Mrs. J. L. Gardner, $12.

Stellata type, six plants:
1st, William Whitman, $12; 2d, Mrs. J. L. Gardner, $8.

SCHIZANTHUS.— Six plants:
1st, Mrs. Lester Leland, $8; 2d, Weld Garden, $6.

HYACINTHS.— Six pans, not exceeding ten inches in diameter, six bulbs of one distinct variety in each pan:
1st, William Whitman, $12; 2d, Francis Skinner, $8; 3d, Mrs. C. G. Weld, $6.

Single pan, not exceeding twelve inches in diameter, ten bulbs of one variety:
1st, Mrs. C. G. Weld, $4; 2d, Francis Skinner, $3; 3d, Hon. G. von L. Meyer, $2.

Single pan, not exceeding ten inches in diameter, six bulbs of one variety:
1st, Francis Skinner, $3; 2d, William Whitman, $2; 3d, A. F. Estabrook, $1.

Two eight-inch pans, two distinct varieties, for amateurs only:
1st, H. L. Rand, $5; 2d, Miss M. A. Rand, $3; 3d, Miss M. A. Rand, $2.

SINGLE EARLY TULIPS.— Six eight-inch pans, one distinct variety in each pan:
1st, William Whitman, $10; 2d, A. F. Estabrook, $8; 3d, A. W. Preston, $6.

Any white variety, other than Joost van Vondel, three eight-inch pans:
1st, A. W. Preston, $5.

Mon Tresor, three eight-inch pans:
1st, A. W. Preston, $5; 2d, William Whitman, $3; 3d, A. F. Estabrook, $2.

Any other yellow variety, three eight-inch pans:
1st, William Whitman, $5; 2d, A. W. Preston, $3.

Any red variety other than Vermilion Brilliant, three eight-inch pans:
1st, A. W. Preston, $5; 2d, William Whitman, $3; 3d, A. F. Estabrook, $2.

Keizerkroon, three eight-inch pans:
1st, William Whitman, $5; 2d, A. F. Estabrook, $3.

Pink Beauty, three eight-inch pans:
1st, Mrs. J. L. Gardner, $5; 2d, A. W. Preston, $3; 3d, William Whitman, $2.

Any other pink or pink and white variety, three eight-inch pans:
1st, A. W. Preston, $5.

Duchess of Parma, three eight-inch pans:
1st, William Whitman, $5; 2d, A. F. Estabrook, $3.

Two eight-inch pans, two varieties, for amateurs only:
1st, H. L. Rand, $5; 2d, Miss M. A. Rand, $3; 3d, Miss M. A. Rand, $2.

DOUBLE TULIPS.— Six eight-inch pans, in not less than three varieties:
1st, Francis Skinner, $10; 2d, William Whitman, $8; 3d, A. W. Preston, $6.

NARCISSUSES.— Collection of Large Trumpet varieties, not less than ten eight-inch pots, one distinct variety in each:
1st, William Whitman, $15; 2d, William Whitman, $12.

Large Trumpet varieties, four eight-inch pots, one distinct variety in each:
1st, William Whitman, $6; 2d, A. W. Preston, $4; 3d, Francis Skinner, $3.

Collection of Short Trumpet varieties, not less than ten eight-inch pots, one distinct variety in each:
1st, A. W. Preston, $15; 2d, William Whitman, $12.

Short Trumpet varieties, four eight-inch pots, one distinct variety in each:
1st, William Whitman, $6; 2d, A. W. Preston, $4; 3d, Francis Skinner, $3.

Two eight-inch pots, two varieties, for amateurs only:
1st, H. L. Rand, $3; 2d, Miss M. A. Rand, $2; 3d, Miss M. A. Rand, $1.

CROCUS.— Three eight-inch pans, one distinct variety in each:
1st, Mrs. J. L. Gardner, $4; 2d, A. F. Estabrook, $3.

LILY OF THE VALLEY.— Six six-inch pots:
1st, Mrs. C. G. Weld, $6; 2d, J. T. Butterworth, $4; 3d, J. T. Butterworth, $3.

AMARYLLIS.— Twelve pots, distinct varieties:
1st, Mrs. C. G. Weld, $15.

LILIUM LONGIFLORUM.— Six pots:
1st, Francis Skinner. $10.

General Display of Spring Bulbous Plants. — All classes, to be arranged with foliage plants:

1st, Mrs. J. L. Gardner, $30; 2d, Mrs. J. L. Gardner, $20.

Forced Bulbs.— Six pans, grown without the aid of a frame or greenhouse, for amateurs only:

1st, H. L. Rand, $10; 2d, Miss M. A. Rand, $8; 3d, Miss M. A. Rand, $6.

Orchids.— Group of plants arranged for effect with ferns or other foliage plants, to cover not less than fifty square feet:

1st, E. B. Dane, $40 and Silver Medal.

Specimen plant:

1st, W. A. Manda, $6; 2d, Mrs. Lester Leland, $4; 3d, Weld Garden, $2.

Roses in Vases.— Collection of not less than four varieties, twelve blooms of each:

1st, W. H. Elliott, $25.

Twenty-five blooms of Richmond:

1st, W. H. Elliott, $12.

Twenty-five blooms of Killarney:

1st, Waban Rose Conservatories, $12; 2d, W. H. Elliott, $8.

Twenty-five blooms of Lady Hillingdon:

1st, W. H. Elliott, $12.

Twenty-five blooms of any pink variety:

1st, W. H. Elliott, $12.

Twenty-five blooms of any new named variety not in commerce:

1st, Waban Rose Conservatories, Silver Medal.

Carnations.— Vase of one hundred cut blooms of one variety, with foliage:

1st, A. A. Pembroke, $12; 2d, A. A. Pembroke, $8.

Fifty blooms of any named crimson variety:

1st, W. R. Nicholson, $5; 2d, Scott Bros., $4.

Fifty blooms of any named dark pink variety:

1st, A. A. Pembroke, $5; 2d, S. J. Goddard, $4.

Fifty blooms any named Winsor-shade variety:

1st, A. A. Pembroke, $5; 2d, S. J. Goddard, $4.

Fifty blooms any named Enchantress-shade pink variety:

1st, S. J. Goddard, $5; 2d, Strout's, $4; 3d, A. A. Pembroke, $3.

Fifty blooms any named white variegated variety:

1st, A. A. Pembroke, $5; 2d, S. J. Goddard, $4.

Fifty blooms any named white variety:

1st, A. A. Pembroke, $5; 2d, Strout's, $4; 3d, A. A. Pembroke, $3.

Violets.— Bunch of one hundred blooms of any named single variety:

1st, E. Bingham, $3.

Bunch of one hundred blooms of any named double variety:

1st, E. Bingham, $3.

Sweet Peas.— Fifty sprays of any white variety:

1st, William Sim, $4.

Fifty sprays of any light pink variety:
1st, William Sim, $4.
Fifty sprays of any deep pink variety:
1st, William Sim, $4.
Fifty sprays of any lavender variety:
1st, William Sim, $4.

ANTIRRHINUMS.— Vase of twenty-five spikes:
1st, F. W. Fletcher, $6; 2d, James Wheeler, $4; 3d, G. E. Buxton, $3.

TABLE DECORATION.— For the best table decoration laid for six covers:
1st, Mrs. Duncan Finlayson, $50; 2d, Wax Bros., $30; 3d, H. R. Comley, $20.

Gratuities:—

Mrs. Frederick Ayer, pair of Palms, $5.
Weld Garden, collection of stove and greenhouse plants, $30.
Edward MacMulkin, display of palms and decorative plants, $15.
William Whitman, display of bulbous and decorative plants, $12.
Mrs. C. G. Weld, display of bulbous plants, $10.
Knight & Struck, display of hard-wooded plants, $5.
Mrs. C. G. Weld, display of Orchids and decorative plants, $25.
F. J. Dolansky, display of Gardenias and Orchids, $5.
W. W. Edgar Co., display of trained Cytisus, $5.
Mrs. C. G. Weld, two standard Cytisus, $4.
Mrs. Lester Leland, artistic basket-plant of *Cytisus racemosus*, $5.
M. A. Patten, Carnation Princess Dagmar, $5.
Strout's, display of Carnations, $10.
M. A. Patten, vase of Carnations, $3.
James Wheeler, " " " $4.
A. N. Pierson, display of Rose Milady and *Adiantum Farleyense*, in pots, $5.
Weld Garden, *Cymbidium eburneum Lowii*, $2.
F. W. Fletcher, Antirrhinums, $5.
Mrs. E. M. Gill, display of cut flowers, $5.
T. T. Watt, " " " " $5.

MAY EXHIBITION.

MAY 17 AND 18.

CALCEOLARIAS.— Large Flowered, six varieties, in pots:
1st, Mrs. C. G. Weld, $15; 2d, Mrs. J. L. Gardner, $10.

TULIPS.— Darwin, collection of twelve varieties, six blooms of each:
1st, Francis Skinner, $10.

Late Flowering, other than Darwin, twelve varieties, six blooms of each:
1st, Francis Skinner, $8.
Late Flowering, any or all classes, three blooms of each variety:
1st, Francis Skinner, $15; 2d, A. W. Preston, $10.

PANSIES.— Forty-eight blooms, not less than twenty-four varieties:
1st, William Whitman, $3; 2d, A. W. Preston, $2; 3d, William Whitman, $1.

Gratuities:—

Mrs. J. L. Gardner, collection of Orchid plants, $10.
E. B. Dane, collection of cut Orchids, $5.
T. T. Watt, " " " " $4.
Mrs. C. G. Weld, specimen Orchid, $2.
" " " " Calceolaria Golden Gem, $2.
Mrs. J. L. Gardner, collection of herbaceous Calceolarias, $2.
William Whitman, four specimens of *Azalea indica*, $4.
E. B. Dane, ten single-stem Hydrangeas, $4.
Mrs. C. G. Weld, standard Hydrangeas, $2.
Blue Hill Nurseries, collection of cut Lilacs, $5.
Mrs. M. W. Chadbourne, display of Lilacs, $3.
Dr. Allen Greenwood, two vases of Tulip Madam Krelage, $2.
A. W. Preston, collection of Tulips, $2.
Mrs. J. L. Gardner, collection of Gladioli, $4.
A. W. Preston, vase of *Lilium candidum*, $1.
F. J. Rea, collection of cut herbaceous flowers, $2.
William Whitman, collection of cut flowers, $8.
T. T. Watt, " " " " $3.
Mrs. E. M. Gill, " " " " $3.

PEONY AND RHODODENDRON EXHIBITION.

JUNE 7 AND 8.

ORCHIDS.— Display of plants in not less than four genera, arranged for effect with foliage plants:
1st, E. B. Dane, $25; 2d, Mrs. J. L. Gardner, $15.

H. H. Hunnewell Fund No. 3.

RHODODENDRONS.— Largest and best collection, not less than fifteen distinct varieties, six trusses of each, from plants that have been grown in the open in Massachusetts for at least three years:
1st, Francis Skinner, $25.

HARDY AZALEAS.— Twelve varieties, six trusses of each:
1st, Francis Skinner, $10.

Samuel Appleton Fund.

GERMAN IRISES.— Twenty-four vases of three trusses each, of not less than twelve varieties:

1st, William Whitman, $5; 2d, J. W. Dwyer, $3; 3d, T. C. Thurlow's Sons Co., $2.

HARDY HERBACEOUS FLOWERS.— Twenty-five distinct species and varieties, not less than ten genera, grasses admissible:

1st, M. P. Haendler, $10; 2d, Blue Hill Nurseries, $6; 3d, F. J. Rea, $4.

Gratuities:—

F. J. Dolansky, collection of *Cattleya gigas* and *C. Mendelii*, $10.
J. T. Butterworth, specimen *Miltonia vexillaria*, $5.
Miss Cornelia Warren, display of *Oncidium flexuosum*, $8.
Mrs. J. L. Gardner, specimen *Anthurium Brownii*, $3.
" " " " display of Peonies, $3.
William Whitman, collection of Peonies and Rhododendrons, $5.
T. C. Thurlow's Sons Co., collection of Peonies and Iris, $2.
William Whitman, collection of German Iris, $2.
G. B. Page, " " " " $5.
Mrs. Frederick Ayer, two vases of *Viburnum Opulus*, $1.
Patten & Co., artistically arranged vase of Carnation Princess Dagmar, $5.
Mrs. Frederick Ayer, two vases of Carnations, $2.
William Sim, vase of Sweet Peas, $2.
Mrs. R. Goodnough, vase of Hemerocallis, $1.
Mrs. Frederick Ayer, *Phoenix Roebelenii*, $4.
Miss Cornelia Warren, display of Hydrangeas in pots, $6.
Mrs. E. M. Gill, display of cut flowers, $2.

SPECIAL EXHIBITION OF PEONIES.

JUNE 14 AND 15.

HERBACEOUS PEONIES.— Collection of twenty named varieties, double, one flower of each:

1st, G. H. Peterson, $10; 2d, Mrs. James McKissock, $6; 3d, T. C. Thurlow's Sons Co., $4.

Collection of ten named varieties, double, three flowers of each:

1st, G. H. Peterson, $10; 2d, Mrs. J. L. Gardner, $6; 3d, Mrs. James McKissock, $4.

Specimen bloom, double:
1st, G. H. Peterson, Auguste Villaume, $2; 2d, William Whitman, Alexander Dumas, $1.
Collection of twelve named varieties, single, one bloom of each:
1st, T. C. Thurlow's Sons Co., $4; 2d, William Whitman, $3.
Vase of blooms on long stems, arranged for effect in the Society's large China vases:
1st, Mrs. J. L. Gardner, $10.
Collection of six named double varieties, white, one flower of each:
1st, Mrs. J. L. Gardner, $3; 2d, T. C. Thurlow's Sons Co., $2; 3d, Dr. C. S. Minot, $1.
Collection of six named double varieties, rose pink, one flower of each:
1st, Mrs. J. L. Gardner, $3; 2d, Mrs. James McKissock, $2; 3d, T. C. Thurlow's Sons Co., $1.
Collection of six named double varieties, red or crimson, one flower of each:
1st, Mrs. James McKissock, $3; 2d, T. C. Thurlow's Sons Co., $2.
Vase of twenty-five blooms, double, white or blush:
1st, Mrs. J. L. Gardner, $5; 2d, G. H. Peterson, $3; 3d, J. R. Comley, $2.
Vase of twenty-five blooms, double, pink or rose:
1st, William Whitman, $5; 2d, G. H. Peterson, $3; 3d, William Whitman, $2.
Vase of twenty-five blooms, double, red or crimson:
1st, G. H. Peterson, $5; 2d, Mrs. J. L. Gardner, $3; 3d, William Whitman, $2.
Vase of twenty-five blooms, double, any other color:
1st, William Whitman, $5; 2d, T. C. Thurlow's Sons Co., $3; 3d, Mrs. James McKissock, $2.
Collection of twelve named varieties, double, one flower of each, for non-commercial growers only:
1st, Mrs. J. L. Gardner, $6; 2d, William Whitman, $4; 3d, Dr. C. S. Minot, $3.

Gratuities:—

E. J. Shaylor, display of Peonies, $10.
Breck, Robinson Co., display of Peonies and herbaceous flowers, $6.
William Whitman, collection of Peonies, $5.
G. W. Page, collection of seedling Peonies, $5.
Mrs. E. M. Gill, collection of Peonies and Roses, $8.
T. C. Thurlow's Sons Co., display of Peonies, $3.
Mrs. J. B. David, three vases of Peonies, $1.
A. W. Preston, collection of Pyrethrums, $5.
T. T. Watt, collection of Orchids with foliage, $4.
J. T. Butterworth, two specimen Orchids, $3.
" " " collection of Spanish Iris, $5.

Eastern Nurseries, display of herbaceous flowers, $10.
M. P. Haendler, " " " " $10.
Mt. Desert Nurseries, " " " " $10.
Mrs. Frederick Ayer, display of Fuchsias, $8.
Ellen Page, collection of native plants, $5.

Rose and Strawberry Exhibition.

June 21 and 22.

Theodore Lyman Fund No. 2.

Hardy Roses.— Collection, named, not less than twenty varieties filling fifty vases:
1st, W. J. Clemson, $20; 2d, H. E. Converse, $15; 3d, T. N. Cook, $10.

John C. Chaffin Fund.

(For amateurs only).

Best three blooms, any white Hybrid Perpetual Rose:
1st, Boston Consumptives' Hospital, $5; 2d, Robert Seaver, $3.
Best three blooms any pink Hybrid Perpetual Rose:
1st, Robert Seaver, $5; 2d, Robert Seaver, $3; 3d, Mrs.R. Goodnough, $2.
Best three blooms any red Hybrid Perpetual Rose:
1st, Boston Consumptives' Hospital, $5; 2d, Robert Seaver, $3; 3d, Robert Seaver, $2.
Basket of Hybrid Perpetual Roses, artistically arranged:
1st, Robert Seaver, $5.

Society's Prizes.

Hybrid Perpetual, twelve named varieties, three of each:
1st, W. J. Clemson, $12; 2d, Col. Frederick Mason, $8.
Six named varieties, three of each:
1st, Robert Seaver, $6; 2d, Robert Seaver, $4; 3d, T. N. Cook, $3.
Twelve named varieties, one of each:
1st, Duncan Finlayson, $4.
Six named varieties, one of each:
1st, Boston Consumptives' Hospital, $3; 2d, Duncan Finlayson, $2; 3d, T. N. Cook, $1.
Hybrid Tea, collection of twelve varieties, three blooms of each:
1st, Joseph Werner, $15; 2d, H. E. Converse, $10.

Best three blooms of a Hybrid Tea variety introduced since 1908:
1st, T. N. Cook, $3; 2d, T. N. Cook, $2; 3d, Robert Seaver, $1.
Six blooms, any white variety:
1st, A. W. Preston, $3.
Six blooms, any yellow variety:
1st, A. W. Preston, $3.
Six blooms, any pink variety:
1st, A. W. Preston, $3; 2d, Mrs. J. L. Gardner, $2; 3d, A. W. Preston, $1.
Six blooms, any red variety:
1st, Robert Seaver, $3; 2d, A. W. Preston, $2; 3d, T. N. Cook, $1.
Basket, artistically arranged:
1st, Robert Seaver, $5; 2d, Robert Seaver, $3.
General display, one hundred bottles of hardy Roses, named, in the Society's racks, buds admissible:
1st, W. J. Clemson, $15; 2d, Mrs. Frederick Ayer, $10; 3d, Col. Frederick Mason, $8.
For the most artistic decoration of Roses, with rose foliage, to fill space not exceeding fifty square feet:
1st, Duncan Finlayson, $30.
Best decoration of Roses for table of eight covers:
1st, Mrs. Gustav Peterson, $25.

SWEET WILLIAMS.— Display, eighteen vases of three trusses each, not less than six varieties:
1st, Mrs. J. L. Gardner, $3; 2d, A. W. Preston, $2.

HARDY HERBACEOUS FLOWERS.— Twenty-five vases, distinct species and varieties, not less than ten genera, for private growers only:
1st, Duncan Finlayson, $8; 2d, Walter Hunnewell, $6.
Best display:
1st, Old Town Nurseries, Silver Medal; 2d, Eastern Nurseries, Bronze Medal.

CAMPANULA MEDIUM.— Collection filling twelve vases, one color in a vase:
1st, Mrs. Frederick Ayer, $4.

Gratuities:—

Mrs. Frederick Ayer, display of Roses, $3.
Mrs. E. M. Gill, display of Hardy Roses, $4.
Duncan Finlayson, display of Roses, $2.
E. J. Shaylor, collection of Peonies, $5.
Mrs. C. G. Weld, two vases of Peonies, $5.
Breck, Robinson Co., display of Peonies, $5.
G. W. Page, display of seedling Peonies, $2.
T. C. Thurlow's Sons Co., display of named Peonies, $12.
Harvard Botanic Garden, display of Aquatics, $15.
Mrs. N. P. Cutler, Sweet Williams, $1.

Harvard Botanic Garden, display of Fuchsias in pots, $10.
E. B. Dane, display of cut Orchids, $8.
F. J. Dolansky, display of Orchids in pots, $5.
J. T. Butterworth, display of Orchids in pots, $5.
E. B. Dane, display of *Gladiolus Colvillei* hybrids, $2.
William Sim, display of Sweet Peas, $5.
Mt. Desert Nurseries, display of hardy herbaceous flowers and flowering shrubs, $10, and Honorable Mention.

Sweet Pea Exhibition.

July 12 and 13.

Sweet Peas.— Decoration for table of eight covers:
1st, Wax Bros., $30; 2d, H. R. Comley, $20.

John Allen French Fund.

Twenty-five sprays, any white variety:
1st, Mrs. Lester Leland, Moneymaker, $4; 2d, Mt. Desert Nurseries, Etta Dyke, $3; 3d, Mrs. Lester Leland, White Spencer, $2.
Twenty-five sprays, crimson or scarlet:
1st, Mrs. Lester Leland, Scarlet Emperor, $4; 2d, Mt. Desert Nurseries, Maud Holmes, $3; 3d, Mrs. Lester Leland, King Edward VII, $2.
Twenty-five sprays, rose or carmine:
1st, Mrs. T. J. Emery, John Ingman, $4; 2d, Col. Charles Pfaff, George Herbert, $3; 3d, Mt. Desert Nurseries, John Ingman, $2.
Twenty-five blooms, yellow or buff:
1st, Mrs. Lester Leland, Dobbie's Cream, $4; 2d, Mt. Desert Nurseries, Primrose Spencer, $3; 3d, G. W. Vanderbilt, Primrose Beauty, $2.
Twenty-five sprays, blue:
1st, Mt. Desert Nurseries, Lord Nelson, $4; 2d, G. W. Vanderbilt, Blue Jacket, $3; 3d, Col. Charles Pfaff, Captain of the Blues, $2.
Twenty-five sprays, blush:
1st, Mrs. T. J. Emery, Mrs. Hardcastle Sykes, $4; 2d, Mt. Desert Nurseries, Mrs. Hugh Dickson, $3; 3d, Mrs. Lester Leland, Mrs. Hardcastle Sykes, $2.
Twenty-five sprays, cerise:
1st, Mrs. T. O. Richardson, Millie Naslin, $4; 2d, G. W. Vanderbilt, Royal Rose, $3; 3d, Mt. Desert Nurseries, Marie Corelli, $2.
Twenty-five sprays, deep pink:
1st, Mrs. Lester Leland, Hercules, $4; 2d, R. W. Goelet, Mrs. Spencer, $3; 3d, Mrs. P. G. Forbes, Countess Spencer, $2.

Twenty-five sprays, cream pink:
1st, Mt. Desert Nurseries, Doris Usher, $4; 2d, Mrs. Lester Leland, Duplex Spencer, $3; 3d, Mrs. P. G. Forbes, W. T. Hutchins, $2.
Twenty-five sprays, orange:
1st, Mrs. T. J. Emery, Thomas Stevenson, $4; 2d, Mt. Desert Nurseries, Edrom Beauty, $3; 3d, G. W. Vanderbilt, Thomas Stevenson, $2.
Twenty-five sprays, lavender:
1st, Mrs. T. O. Richardson, Asta Ohn, $4; 2d, Mt. Desert Nurseries, Florence Nightingale, $3; 3d, Mrs. T. J. Emery, Florence Nightingale, $2.
Twenty-five sprays, violet or purple:
1st, Mrs. Lester Leland, Tennant, $4; 2d, Mrs. P. G. Forbes, Tennant, $3.
Twenty-five sprays, mauve:
1st, Col. Charles Pfaff, $4; 2d, H. Heeremans, Irish Belle, $3; 3d, H. E. Converse, Queen of Norway, $2.
Twenty-five sprays, maroon or bronze:
1st, Miss Fanny Foster, Brunette, $4; 2d, Mrs. Lester Leland, Black Knight, $3; 3d, H. Heeremans, Nubian, $2.
Twenty-five sprays, picotee-edged:
1st, G. W. Vanderbilt, Eric Harvey, $4; 2d, Miss Fanny Foster, Dainty Spencer, $3; 3d, Mt. Desert Nurseries, Distinction, $2.
Twenty-five sprays, striped or flaked red or rose:
1st, Miss Fanny Foster, May Campbell, $4; 2d, Col. Charles Pfaff, American Spencer, $3; 3d, Mrs. T. J. Emery, Ethel Roosevelt, $2.
Twenty-five sprays, striped or flaked blue or purple:
1st, Mt. Desert Nurseries, Senator Spencer, $4; 3d, S. Carlquist, Prince Olaf, $2.
Twenty-five sprays, bicolor:
1st, Mt. Desert Nurseries, Blanch Ferry Spencer, $4.

SPENCERS.

Best vase, white, twenty-five sprays to a vase:
1st, Mrs. T. J. Emery, Etta Dyke, $3; 2d, B. A. Beal, Nora Unwin, $2.
Best vase, lavender or blue:
1st, G. W. Vanderbilt, Florence Nightingale, $3; 2d, Mrs. T. J. Emery, Florence Nightingale, $2.
Best vase, orange:
1st, J. H. Stafford, Thomas Stevenson, $3; 2d, Mrs. Lester Leland, Thomas Stevenson, $2.
Best vase, crimson or scarlet:
1st, Mrs. Lester Leland, George Washington, $3; 2d, W. J. Clemson, King Edward VII, $2.

Best vase, light pink:
1st, Miss Fanny Foster, Elfrida Pearson, $3; 2d, H. Heeremans, Constance Oliver, $2.
Best vase, dark pink:
1st, Mrs. P. G. Forbes, Countess Spencer, $3; 2d, W. J. Clemson, Apple Blossom Spencer, $2.
Best vase, any other color:
1st, G. W. Vanderbilt, Mrs. C. W. Breadmore, $3; 2d, Mrs. Lester Leland, Ruby Spencer, $2.

GRANDIFLORA TYPES.

Best vase, white, twenty-five sprays to a vase:
1st, Miss Marion Collins, Dorothy Eckford, $3.

Society's Prizes.

(For amateurs only).

Best vase, white, twelve sprays to a vase:
1st, J. A. Raddin, $3; 2d, C. W. Lambert, $2.
Best vase, pink:
1st, J. A. Raddin, $3; 2d, I. H. Miller, $2.
Best vase, dark pink:
1st, J. A. Raddin, $3; 2d, C. W. Lambert, $2.
Best vase, lavender:
1st, J. A. Raddin, $3; 2d, C. W. Lambert, $2.
Best vase, salmon or rose:
1st, J. A. Raddin, $3; 2d, C. W. Lambert, $2.
Best vase, crimson or scarlet:
1st, J. A. Raddin, $3; 2d, C. W. Lambert, $2.
Best vase, primrose:
1st, W. D. Blossom, $3; 2d, J. A. Raddin, $2.
Best vase, any other color:
1st, C. W. Lambert, $3; 2d, J. A. Raddin, $2.

Gratuities:—

William Whitman, display of Sweet Peas, $5.
W. J. Clemson, " " " " $2.
F. J. Dolansky, collection of Orchids, $10.
J. T. Butterworth, specimen Orchid, $3.
Mrs. J. L. Gardner, " " $2.
John Lewis Childs, display of Gladioli, $5.
B. H. Tracy, " " " $3.

Mrs. Lester Leland, display of Tuberous Rooted Begonias, $12.
Mrs. J. L. Gardner, *Statice Suworowi*, $1.
Col. Frederick Mason, display of Hollyhocks, $1.
Eastern Nurseries, display of herbaceous flowers, $12.
William Whitman, " " " " $4.
Ellen Page, collection of native plants, $4.
Mrs. E. M. Gill, display of cut flowers, $4.

Gladiolus and Phlox Exhibition.

August 9 and 10.

Perennial Phloxes.— Twelve named varieties, one truss of each:
1st, Eastern Nurseries, $4; 2d, William Whitman, $3; 3d, F. J. Rea, $2.
General display in not less than thirty vases, named:
1st, F. J. Rea, $8; 2d, Eastern Nurseries, $6; 3d, T. C. Thurlow's Sons Co., $4.
Gladioli.— Twelve named varieties, one spike of each:
1st, C. W. Brown, $3; 2d, C. W. Brown, $2; 3d, A. W. Preston, $1.
Display of named and unnamed varieties filling one hundred vases, arranged for effect with any foliage:
1st, Mrs. Frederick Ayer, $8.
China Asters.— Display of Large Flowered of all classes, named, not less than fifty vases, three flowers in each:
1st, William Whitman, $6.
Annuals.— General display, named, not less than thirty species, filling not less than one hundred bottles:
1st, Mrs. J. L. Gardner, $10; 2d, William Whitman, $8.

Gratuities:

B. H. Tracy, display of Gladioli, $20, and Honorable Mention.
Chamberlain & Gage, " " " $20, and Honorable Mention.
Old Town Nurseries, " " " $5.
Mrs. C. G. Weld, " " " $4.
William Whitman, display of Gladioli and hardy flowers, $10.
E. F. Dwyer & Sons, display of cut Dahlias, $3.
Mrs. Frederick Ayer, display of Montbretias, $3.
E. L. Lewis, display of Sweet Peas, $2.
A. W. Preston, " " " " $1.
Mrs. J. L. Gardner, display of *Antirrhinum Brownii* with other decorative plants, $8.
Mt. Desert Nurseries, display of hardy flowers, $15.
Old Town Nurseries, " " " " $10.
Eastern Nurseries, " " " " $6.
Mrs. E. M. Gill, display of cut flowers, $3.

Dahlia and Fruit Exhibition.

September 12, 13, and 14.

Dahlias.— Show or Fancy, twenty-four blooms, named varieties:
1st, W. D. Hathaway, $4; 2d, E. F. Dwyer & Sons, $3.
Show, twelve blooms, named varieties:
1st, E. W. Ela, $3; 2d, A. E. Johnson, $2; 3d, W. H. Symonds, $1.
Cactus, twenty-four blooms, named varieties:
1st, Sisson & Thurston, $4; 2d, W. D. Hathaway, $3; 3d, J. K. Alexander, $2.
Cactus, twelve blooms, named varieties:
1st, Miss Fanny Foster, $3; 2d, A. E. Johnson, $2; 3d, E. W. Ela, $1.
Decorative, twenty-four blooms, named varieties:
1st, W. D. Hathaway, $4; 2d, E. F. Dwyer & Sons, $3.
Decorative, twelve blooms, named varieties:
1st, E. W. Ela, $3; 2d, A. E. Johnson, $2; 3d, W. H. Symonds, $1.
Peony-flowered, twenty-four blooms, named varieties:
1st, W. D. Hathaway, $4; 2d, J. K. Alexander, $3.
Peony-flowered, twelve blooms, named varieties:
1st, Sisson & Thurston, $3; 2d, E. F. Dwyer & Sons, $2.
Pompon, twenty-four vases of three blooms each, named varieties:
1st, J. K. Alexander, $4; 2d, W. D. Hathaway, $3.
Pompon, twelve vases of three blooms each, named varieties:
1st, E. F. Dwyer & Sons, $3.
Single, twelve vases of three blooms each, named varieties:
1st, Sisson & Thurston, $3; 2d, E. W. Ela, $2.
Largest and best collection of named varieties, one vase of each:
1st, G. H. Walker, $8; 2d, Mrs. L. M. Towle, $6.

Hardy Herbaceous Flowers.— Best display:
1st, Eastern Nurseries, a Silver Medal.

Hybrid Tea Roses.— Twelve varieties, three blooms of each:
1st, A. W. Preston, $5; 2d, T. N. Cook, $4; 3d, T. N. Cook, $3.

Gratuities:—

T. W. Head, display of Dahlias, $5.
G. B. Gill, " " " $3.
G. H. Walker, " " " $2.
Fottler, Fiske, Rawson Co., display of Gladioli and Dahlias, $15.
B. H. Tracy, artistic display of Gladioli, $15, and Honorable Mention.
Old Town Nurseries, display of herbaceous flowers, $10.
William Whitman, display of herbaceous flowers and annuals, $20.
F. J. Rea, display of Phloxes and other flowers, $2.
Mrs. J. L. Gardner, two decorative plants, $5.

Peirce Bros., artistic display of Rose Mme. Cecile Brunner, $3, and Honorable Mention.
Mrs. Frederick Ayer, decoration of steps, $10.
Mrs. E. M. Gill, display of cut flowers, $2.
Mrs. M. W. Chadbourne, " " " " $1.
T. L. Dean, display of native flowers, $1.

Chrysanthemum Show.

October 30, 31, November 1, and 2.

Foliage and Flowering Plants.— Best arranged group covering three hundred square feet:
1st, W. W. Edgar Co., $50.
Best arranged group covering one hundred and fifty square feet:
1st, Mrs. J. L. Gardner, $40.
Orchids.— Best table of Orchids, both plants and flowers, six or more genera, accurately named:
1st, Mrs. J. L. Gardner, $50; 2d, F. J. Dolansky, $40; 3d, Mrs. C. G. Weld, $30.
Cattleya labiata.— Best specimen: 1st, F. J. Dolansky, $5.
Cypripedium insigne.— Best specimen:
1st, Mrs. J. L. Gardner, $5; 2d, J. T. Butterworth, $3.
Oncidium verrucosum Rogersii.— Best specimen:
1st, J. T. Butterworth, $5; 2d, T. T. Watt, $3.
Chrysanthemums.— Group of plants to cover three hundred square feet:
1st, T. E. Proctor, $60 and Silver Medal; 2d, Walter Hunnewell, $40; 3d, W. H. Elliott, $20.
Four specimen plants, any color or class:
1st, J. S. Bailey, $60.
Two specimen plants, any color or class:
1st, J. S. Bailey, $30; 3d, N. F. Comley, $10.
One specimen plant, yellow:
1st, N. F. Comley, $15.
One specimen plant, pink:
1st, J. S. Bailey, $15.
Twenty-five plants, commercial specimens, in not less than six varieties:
1st, W. H. Elliott, $30; 2d, W. H. Elliott, $20.
Six plants of six different varieties, grown to six stems with one bloom to each stem, in seven-inch pots:
1st, T. E. Proctor, $10.
Kentias.— Two plants, eight feet high or over:
1st, William Whitman, $15; 2d, Mrs. Frederick Ayer, $12; 3d, William Whitman, $10.

ARECAS.— One or more plants in a tub, eight feet high or over:
1st, William Whitman, $15; 2d, Mrs. Frederick Ayer, $12.
BEGONIA.— Gloire de Lorraine, three plants:
1st, E. A. Clark, $10; 2d, W. W. Edgar Co., $8.
Glory of Cincinnati, three plants:
1st, A. F. Estabrook, $10; 2d, E. A. Clark, $8.

Samuel Appleton Fund.

CHRYSANTHEMUM.— Best plant on exhibition:
J. S. Bailey, the Appleton Silver Medal.

Josiah Bradlee Fund.

CHRYSANTHEMUMS.— Twenty-five blooms, of twenty-five distinct varieties, named:
1st, H. E. Converse, $20; 2d, Ernest Townsend, $15.

Henry A. Gane Memorial Fund.

For the best vase of blooms of the Mrs. Jerome Jones or the Yellow Mrs. Jerome Jones:
1st, James Nicol, $20; 2d, James Nicol, $10.

Society's Prizes.

Twelve blooms, Japanese, named, in vases:
1st, E. B. Jordan, $8; 2d, E. A. Clark, $6; 3d, Mrs. H. R. Johnstone, $4.
Twelve blooms, Japanese Incurved, named, in vases:
1st, H. E. Converse, $8.
Twelve blooms, Reflexed, named, in vases:
1st, H. E. Converse, $8.
Twelve sprays or branches of Pompon, distinct varieties:
1st, E. K. Butler, $5.
Vase of ten blooms on long stems, pink, named:
1st, James Nicol, $10; 3d, W. W. Edgar Co., $6.
Vase of ten blooms on long stems, red, named:
1st, E. A. Clark, $10; 2d, Ernest Townsend, $8.
Vase of ten blooms on long stems, white, named:
1st, James Nicol, $10; 2d, E. A. Clark, $8; 3d, Hon. G. von L. Meyer, $6.

Gratuities:—

N. F. Comley, display of Chrysanthemums with autumn foliage, $15.
C. H. Totty, display of small-flowered Chrysanthemums, $15.

Mrs. E. M. Gill, display of Chrysanthemums, $5.
E. A. Clark, vase of yellow Chrysanthemums, $10.
Mrs. H. R. Johnstone, vase of yellow Chrysanthemums, $6.
F. P. Putnam, display of small-flowered Chrysanthemums, $8.
Mrs. J. M. Sears, display of seedling Chrysanthemums, $5, and Honorable Mention.
Kameyama & Serada, vase of Chrysanthemum Maj. Bonnaffon, $2.
Edward MacMulkin, artistic display of Chrysanthemums and foliage plants, $25.
A. N. Pierson, display of Chrysanthemums and Roses, $10.
Peter Fisher, Carnation Gorgeous, $4.
M. A. Patten, vase of Carnation Princess Dagmar, $2.
H. A. Stevens, vase of Carnations, $2.
T. T. Watt, display of Orchids and foliage plants, $5.
J. S. Bailey, specimen *Dracaena Godseffiana*, $3.
" " " *Selaginella reflecta*, $3.
Knight & Struck, display of *Erica regerminans ovata*, $3.
A. W. Preston, forced *Spiraea floribunda*, $1.
A. F. Estabrook, display of Begonia Glory of Cincinnati, $5.
Mrs. J. M. Sears, display of single Camellias, $3.
F. J. Dolansky, display of *Gardenia Veitchii*, $1.
A. Leuthy & Co., display of foliage plants, $25.
Breck, Robinson Co., group of hardy evergreen shrubs, $10, and Honorable Mention.
Mrs. Frederick Ayer, two Palms, $5.

DECEMBER 6.

Gratuity:—

Mrs. J. L. Gardner, display of plants in bloom, $10.

Additional Awards.

GOLD MEDALS.

June 14. William Sim, collection of Sweet Peas.
" " Mt. Desert Nurseries, Eremurus.
" " R. & J. Farquhar & Co., artistic display of Peonies.
August 9. " " " " " *Lilium Sargentiae.*

SILVER GILT MEDAL.

October 30. City of Boston, display of Palms and other foliage plants.

SILVER MEDALS.

January 11. George McWilliam, *Calanthe Laselliana* (*C. oculata gigantea* × C. McWilliami).

March 8. Walter Hunnewell, Cattleya Wellesley (*Cattleya Percivaliana* × *Laelio-Cattleya Martinetii*).
March 14. William Sim, display of Pansies.
" " Peter Fisher, Carnation Gorgeous.
" " Charles Sander (gardener to C. S. Sargent), display of small-flowered seedling Azaleas.
" " E. B. Dane, hybrid Orchid "Rowena" (*Brassavola Digbyana* × Laelio-Cattleya Doris).
" " R. & J. Farquhar & Co., group of Cyclamens.
" " Walter Hunnewell, display of Heaths.
" " Breck, Robinson Co., display of spring-flowering bulbs.
" " William Sim, artistic display of Violets.
June 7. F. J. Dolansky, *Cattleya Mossiae Wagneri*.
" " A. A. Pembroke, eight vases of Carnations.
" " R. & J. Farquhar & Co., display of German Iris.
June 21. Bayard Thayer, display of new Philadelphus hybrids and seedlings.
August 9. R. & J. Farquhar & Co., artistic display of *Lilium Henryi*.
October 30. N. F. Comley, new hardy Chrysanthemum Terrace Hall.
" " James Marlborough, new fern, *Adiantum Farleyense gloriosa*.

Bronze Medals.

May 17. R. & J. Farquhar & Co., display of Tulips.
October 30. Penn, the florist, artistic decoration of Chrysanthemums.

First Class Certificates of Merit.

January 11. E. B. Dane, *Cypripedium Boltonianum*.
" " Duncan Finlayson, *Cymbidium Wiganianum* (*C. eburneum* × *C. Tracyanum*).
February 1. John Barr, Carnation Mrs. B. P. Cheney.
March 14. Cottage Gardens, white Carnation Matchless.
May 17. G. F. Stewart, two *Calceolaria Stewartii* varieties.
" " Walter Hunnewell, display of *Rhododendron* (Azalea) *sinense* (Wilson's 800).
June 7. R & J. Farquhar & Co., *Spiraea Henryi*.
June 14. Mt. Desert Nurseries, Seedling Peony, No. 213.
" " C. S. Sargent, vase of *Geum coccineum* var. *Bradshawi*.
June 21. E. B. Dane, *Dendrobium Sanderae*.
" " Walter Hunnewell, Laelio-Cattleya Rex (Laelio-Cattleya Amanda × Cattleya Rex).
July 12. W. A. Manda, *Cattleya Harrisoniae* var. *Mandaiana*.
August 9. C. W. Brown, Gladiolus Mongolian.
" " L. W. Ross, Canna Miss Agnes Fitzgerald.

October 4. R. & J. Farquhar & Co., new, seedling, hardy Chrysanthemums from Korea.
October 30. Peter Fisher, new Carnation Alice.
" " E. G. Hill Co., new Chrysanthemum Chieftain.
December 6. Mrs. J. L. Gardner, *Dendrobium superbiens.*
December 9. W. A. Weeks, white sport of Chrysanthemum Dr. Enguehard.

Cultural Certificates.

February 1. E. H. Wetterlow, display of *Cyclamen superba.*
March 14. William Sim, Sweet Peas.
December 6. William Thatcher, *Cattleya Percivaliana.*

Honorable Mention.

January 11. E. B. Dane, collection of rare Orchids.
February 1. Knight & Struck, collection of hard-wooded plants.
" " Mrs. J. L. Gardner, *Aphelandra Roezlii.*
March 14. F. R. Pierson Co., display of Nephrolepis varieties.
" " W. A. Manda, *Nephrolepis tuberosa* var. *plumosa.*
" " " " " *Anthericum Mandaianum.*
" " " " " Begonia Mrs. W. S. Kimball.
" " Breck Robinson Co., display of evergreens.
" " " " " new Narcissus Van Waverin's Giant.
" " Chicago Carnation Co., Carnation Herald.
" " Scott Bros., Carnation William Eccles.
" " S. J. Goddard, seedling crimson Carnation No. 59.
" " H. A. Stevens, light pink Carnation Eleanor.
" " Mrs. Frederick Ayer, *Acacia verticillata.*
" " R. & J. Farquhar & Co., *Jasminum primulinum.*
" " Mrs. R. G. Shaw, *Ulex europaeus.*
" " Miss M. R. Case, display of forced Hepaticas.
May 17. Breck, Robinson Co., collection of flowering shrubs, evergreens, and herbaceous plants.
" " R. & J. Farquhar & Co., display of *Lilium myriophyllum.*
" " " " " " " Primulas and Violas.
" " " " " " " specimen plant of *Clematis montana rubens.*
June 7. Thomas Meehan & Sons, collection of ornamental foliaged shrubs in tubs.
" " A. H. Fewkes, hybrid Hemerocallis.
" " C. W. Parker, collection of Iris and other flowers.
" " " " " vase of *Wistaria multijuga.*
" " Mt. Desert Nurseries, collection of herbaceous flowers.

June 7. Walter Hunnewell, display of hybrid Rhododendrons.
" " Bayard Thayer, *Hydrangea Sargentiana*.
" " R. & J. Farquhar & Co., display of *Paeonia officinalis* varieties.
" " " " " " " display of double Pyrethrums.
June 14. Dr. C. S. Minot, collection of seedling Peonies.
" " T. T. Watt, specimen *Dendrobium thyrsiflorum*.
June 21. Mrs. James Farquhar, display of hybrid tea Roses.
" " Eastern Nurseries, display of seedling hybrid, climbing, and other Roses.
" " Mrs. H. E. Dolbeare, collection of Rambler Roses.
" " R. & J. Farquhar & Co., display of Foxgloves.
" " " " " " " display of seedling Roses.
July 12. Dr. Harris Kennedy, artistic display of Japan Iris.
" " Julius Roehrs Co., display of Orchids.
" " W. A. Manda, collection of Orchids.
August 9. B. H. Tracy, Gladiolus Barbara.
" " Chamberlain & Gage, Gladiolus, Mrs. L. Merton Gage.
" " " " " " Gaiety.
" " R. & J. Farquhar & Co., display of Salpiglossis hybrids.
September 12. Eastern Nurseries, Clematis 848 (Purdon).
" " " " Potentilla 821 (Purdon).
" " R. & J. Farquhar & Co., display of Phloxes.
" " " " " " " display of *Buddleia variabilis* varieties.
" " R. & J. Farquhar & Co., display of Palms.
" " Mt Desert Nurseries, display of herbaceous flowers.
October 30. Mrs. J. L. Gardner, Begonia Elatior.
" " Arnold Arboretum, berried shrubs.
" " Peter Fisher, vase of Carnation No. 285.
" " Walter Hunnewell, display of Chrysanthemums.
" " S. J. Goddard, yellow Carnation.
" " E. A. Clark, Begonia Mrs. Heal.
" " Robert Scott & Son, Rose Killarney Brilliant.
December 6. Mrs. J. L. Gardner, three specimen Orchids.
" " " " " " *Aphelandra aurantiaca Roezlii*.

VOTE OF THANKS.

June 21. Walter Hunnewell, Marguerite Mrs. Sander.
July 12. R. & J. Farquhar & Co., vase of *Lilium myriophyllum*.
" " Mt. Desert Nurseries, display of *Lilium maculatum*.
October 4. R & J. Farquhar & Co., exhibition of Dahlias.
October 30. R. & J. Farquhar & Co., Palms and Bay Trees.
" " " " " " " Bay Trees in tubs.
" " " " " " " display of Palms.

REPORT OF THE COMMITTEE ON FRUITS FOR THE YEAR 1913.

By Edward B. Wilder, Chairman.

Another year has passed and again we are obliged to record a severe drought during the summer, with the keeping qualities of autumn and winter fruit much impaired.

The Midwinter Show was good, all classes having entries, including the new ones for single dishes of apples and pears.

George V. Fletcher of Belmont took first prize for collection of pears, first prize for single dish of apples with Northern Spy, also first prize for single dish of pears with Dana's Hovey.

The return to the former plan of having a show of fruit at the Spring Exhibition proved very satisfactory, the display being far better than at the Midwinter Exhibition.

At this Show Elliott & H. Ward Moore of Worcester, as in the earlier exhibition, took first prize for the best collection of winter apples, the second prize going to C. H. Leach & Son of Wenham. L. F. Priest of Gleasondale had very fine dishes of McIntosh and Palmer Greening apples. Turner Hill Farm of Ipswich exhibited a collection, Charles W. Mann of Methuen a display of apples, and H. A. Clark of Belmont a basket of Sutton apples.

The exhibit of strawberries June 21–22 was much better than last year. Elliott & H. Ward Moore were awarded first prize for the best collection of ten baskets of two quarts each, and George V. Fletcher first prize for the best six baskets of one quart each of six varieties. The Silver Medal for the best new strawberry not yet introduced went to Samuel McMullen of Milton for the variety called Brewer.

There was an excellent display of cherries. Edward B. Wilder of Dorchester, George V. Fletcher of Belmont, and M. Cahalan of Taunton winning first prizes in the Red, Black, and White or Yellow varieties respectively.

The summer exhibit of small fruits, which was omitted last year, was held in connection with the Sweet Pea Exhibition July 12–13 and was the finest show of small fruits which has been seen here for a long time. Raspberries, cherries, currants, and gooseberries were displayed, there being thirty-seven dishes of gooseberries on the tables. William Whitman of Jamaica Plain, Martin Sullivan, gardener, took first prize for collection of currants and Dr. W. G. Kendall of Atlantic, first prize for a very fine collection of gooseberries. Dr. Kendall also took first prize on both Chatauqua and Industry gooseberries and first prize on any other variety with the Bates gooseberry. George V. Fletcher had the best collection of midsummer fruit arranged for effect, the second prize going to Peter Andersen of Woburn. There is much room for improvement in these decorative displays, especially if the fruit is arranged with its own foliage.

At the Gladiolus and Phlox Exhibition, August 9–10, L. F. Priest took first prize on Oldenburg, Red Astrachan, and Yellow Transparent apples, and George V. Fletcher on Sweet Bough and Williams apples.

Wilfrid Wheeler of Concord carried off the first prize on Greensboro peaches and F. Howard Brown of Marlboro first prize on Waddell. The new peach Mayflower was shown by H. A. Clark and George V. Fletcher.

We were glad to see six baskets of blackberries displayed, H. A. Clark winning first prize with the Dorchester. The cultivated blueberries from William Jennison of Natick also created favorable comment. Mrs. R. Goodnough of West Roxbury again favored the Society with a very fine basket of fruit.

The exhibit of fruit at the Dahlia and Fruit Exhibition, September 12–14, was excellent, the display of native peaches comprising sixty-four dishes, surpassing anything we have ever seen in the hall. H. A. Clark took first prize and A. F. Estabrook of Swampscott second prize for best collection of peaches. Wilfrid Wheeler won first prize on Belle of Georgia, Carman, and Elberta. H. A. Clark took first prize on Champion and Oldmixon, Mrs. R. Goodnough first prize on Niagara, and F. W. Dahl of Roxbury first prize on Late Crawford for any other variety of peaches.

The plums were very fine, the specimens being very large.

George V. Fletcher had the best collection of plums other than Japanese, also a very fine dish of Yellow Egg plums, which won in the single dish class. Myron S. Wheeler of Berlin took first prize on collection of Japanese plums and Alice A. Warburton of Taunton first prize for single dish of Japanese with the Burbank plum.

Edward E. Cole of Greenbush was awarded first prize for a fine collection of fall apples and also for a very fine dish of Gravenstein apples.

There were some good dishes of Bartlett and Clapp's Favorite pears, Elbridge Torrey of Dorchester having the best fruit in both classes.

The Trustees of the Society voted to dispense with the annual fruit exhibition, usually held in October, and combine all the fruit prizes in that show and the Chrysanthemum Exhibition with the Third Exhibition of the New England Fruit Show, November 12–16. Owing to this arrangement the fruit committee was obliged either to eliminate native grapes from the Schedule for the year or place them in this exhibition. Your committee decided on the latter course and, considering the earliness of the season for this fruit, was greatly surprised and pleased by the large display of grapes.

Frederick Mason of Taunton had the best collection of grapes, while Charles W. Libby of Medford, Edward R. Farrar of South Lincoln, Wilfrid Wheeler of Concord, Joseph S. Chase of Malden, and J. Bauernfeind of Medford carried off first prizes in single dishes of grapes.

Again we are indebted to Thomas E. Proctor of Topsfield, James Marlborough gardener, for an excellent collection of foreign grapes, which made a fine show at the end of the small hall, and to H. A. Clark and George V. Fletcher for decorative displays of fruit with foliage.

The New Hampshire Agricultural Experiment Station, Durham, New Hampshire, displayed a large number of muskmelons and French cantaloupes showing the good work done by David Lumsden of the horticultural department in hybridizing the muskmelon. For this excellent work in hybridization the Experiment Station was awarded a Silver Medal.

One of the novelties at this show was the English walnuts grown

from seed planted seventeen years ago by Mrs. Fritz Schulz of Roxbury, also two varieties of German plums grown from stones brought from Germany by Mrs. Schulz.

The event of the year for the fruit interests was the great exhibition of the Massachusetts Horticultural Society, combined with the Third New England Fruit Show, November 12–16. The Society invited the New England Fruit Show to coöperate with it and placed at their disposal all of the halls except the lecture and small halls which were used by the Society for the plate exhibits.

The Schedule included classes for single dishes of seventy-five varieties of apples, divided into four groups and ranging from five prizes to a class in Group One to two prizes to a class in Group Four, all shown in the lecture hall.

There was also a large display of pears, cranberries, seedling apples, fancy baskets and hampers, and tables of apples arranged for decorative effect in this hall. The small hall contained the Granges' or Local Coöperative Fruit Growers Associations' individual exhibits, of not less than fifteen varieties of apples, also collections of six varieties of winter apples and five varieties from Group One.

The first impression made upon judges and fruit growers alike upon entering the halls was the fact that there were not near as many dishes shown as at the New England Fruit Show two years ago, but when we realize that the severe frost in May reduced the apple crop about seventy per cent from a normal yield, we wonder at such a fine display of this fruit.

The improvement in the perfection and type of the fruit was remarkable, showing the great value of our exhibitions from an educational standpoint. Parties who brought poor fruit here two years ago learned what a good specimen was like and how to cultivate one and found the standard so high that they did not dare to bring poor fruit again.

When compared with the former Fruit Show a wonderful improvement was seen in the almost complete elimination of San José scale, illustrating the great value of scientific spraying.

One of the most interesting features of the exhibition was the collections of New England grown apples arranged for decorative effect on tables covering twenty-four square feet. There were

eight entries in this class. E. M. Bruce of Leominster took first prize, A. B. Howard & Son, Belchertown, second prize, and Mrs. R. Goodnough of West Roxbury, third prize.

The first prize for Grange exhibits was awarded the Oxford Bears, Hebron, Maine, the second prize to Wachusett Grange, Leominster, and the third prize to Union Grange, Belchertown.

L. F. Priest of Gleasondale won first prize, Turner Hill Farm, Ipswich, second prize, and A. B. Howard & Son, Belchertown, third prize for best individual exhibits of not less than fifteen varieties of apples. For the best six varieties of winter apples, Otis W. Amidon of Halifax, Vermont, took first prize, Edward E. Cole of Greenbush, Mass., second prize, and A. B. Howard & Son of Belchertown, third prize.

For the best five varieties of apples from Group One Alden Derby of Leominster took first prize, W. H. Conant of Buckfield, Maine, second prize, and Turner Hill Farm, Ipswich, Mass., third prize. We have stated the different prizes in these classes minutely because there were many entries, all good, and an exhibitor winning even third prize in the contest may well be proud of it, take courage, and try again.

There was quite a number competing for the fancy basket or hamper of New England grown apples, but Mrs. R. Goodnough of West Roxbury won first prize in this class. The twenty-five dollar prize for the best seedling apple brought out four entries, N. S. Winsor of Greenville, R. I., receiving the award for a new seedling apple which is very promising.

The committee was gratified to see such a large display of pears so late in the season. F. W. Dahl of Roxbury had the best collection, also the finest Anjou, Angouleme, Lawrence, and Urbaniste pears. Dr. W. G. Kendall of Atlantic had a fine dish of Bosc, Warren Heustis & Son of Belmont, Dana's Hovey, and George V. Fletcher of Belmont, Comice pears.

The quince was well represented, Charles G. Bliss of Essex, Connecticut, taking first prize with the Orange variety.

Cranberries were exhibited by five parties from Cape Cod. Z. H. Jenkins of West Barnstable had the best collection, and F. D. Underwood of Harwich took first prize for a half-peck of any other variety with the Matthews cranberry. The Cranberry Sub-Station

of the Massachusetts Agricultural College at East Wareham was given a Gratuity for a collection of cranberries.

It may be of interest to the Society to learn that many of the plate exhibits have been placed where they will promote the cause of pomology. Fifty varieties of the choicest specimens of Massachusetts grown apples were sent to the Biennial Meeting of the American Pomological Society in Washington, D. C., November 17–21. Another collection went to the Massachusetts Agricultural College, Amherst, and one to the Essex County Agricultural School, Danvers; both of these collections to be used by the students in experimental work.

One collection also went to the Annual Meeting and Exhibition of the Massachusetts State Grange in Tremont Temple, Boston, in December, and one to the Massachusetts Fruit Growers' Association to be used in its twentieth convention and exhibition in Springfield January 15–17, 1914.

We have also more than sixty varieties of the finest specimens of apples in storage to use in the Midwinter Show of the Society, January 31 and February 1, 1914.

The New England Fruit Show occupied the platform in the lecture hall, the loggia, and the large hall with a magnificent display of apples, including large state exhibits in boxes, individual displays in boxes, barrels, and packages, by far the choicest collection of apples ever seen here.

It has been thought that a list of fruits adapted to Massachusetts might be of great assistance to parties comtemplating the growing of fruit and your committee respectfully appends such a list.

EDWARD B. WILDER
WILLIAM DOWNS
HAROLD L. FROST
} *Committee on Fruits.*

FRUITS FOR MASSACHUSETTS.

Explanation. Those marked "Commercial" are our standard varieties, and are also recommended for home orchards, while those in the list of home varieties are not recommended for commercial, except the starred varieties which, in some places, are good commercial sorts.

APPLES.

Recommended for Trial in Home Orchards.	*Commercial.*	*Home Orchards.*
Summer.	*Summer.*	*Summer.*
	Oldenburg	Chenango
Jefferis	Red Astrachan	Early Harvest
	Williams	Primate
	Yellow Transparent	Sweet Bough
Fall.	*Fall.*	*Fall.*
Bay State	Alexander	*Cox Orange Pippin
Delicious	Fall Pippin	Maiden Blush
Shiawassee	Fameuse	*Mother
Walter Pease	Gravenstein	Porter
Washington Strawberry	McIntosh	Ribston Pippin
	Wealthy	
Winter.	*Winter.*	*Winter.*
		Esopus Spitzenburg
Boiken	Baldwin	*Grimes Golden
Ontario		Hunt Russet
Palmer Greening	Hubbardston	Jewett Red
Pomme Gris	King	*Jonathan
Salome	Northern Spy	Lady
	R. I. Greening	Lady Sweet
	Roxbury Russet	*Pound Sweet

Recommended for Trial in Home Gardens.	*Commercial.*	*Home Orchards.*
	APPLES.	
Lincoln	Tolman Sweet	Sutton
	Wagener	Winter Banana
		*Wolf River
		*Yellow Bellflower
	PEARS.	
Summer.	*Summer.*	*Summer.*
	Bartlett	Brandywine
	Clapp's Favorite	Dearborn's Seedling
		Summer Doyenne
		Wilder
Fall.	*Fall.*	*Fall.*
Worden Seckel	Bosc	Belle Lucrative
Vermont Beauty	Comice	Boussock
	Hardy	*Clairgeau
	Seckel	Diel
	Sheldon	Flemish Beauty
		Harris
		Heathcot
		Louise Bonne
		Paradise
		*Seckel
		Superfin
		*Urbaniste
Winter.	*Winter.*	*Winter.*
	Angouleme	Aremburg
	Anjou	Josephine
	Dana's Hovey	McLaughlin
	Langelier	Sieulle
	Lawrence	Vicar
	Winter Nelis	

Recommended for Trial in Home Gardens.	*Commercial.*	*Home Gardens.*
	GRAPES.	
	Concord	Agawam
	Delaware	*Brighton
	Diamond	Campbell's Early
	Moore's Early	Green Mountain
	Niagara	Herbert
	Worden	*Salem
		Wilder
		Woodruff Red
		Ulster
	CHERRIES.	
Bay State	Black Tartarian	Black Eagle
Bing	Large Montmorency	Downer
	Late Duke	Governor Wood
	Richmond	May Duke
	PEACHES.	
Summer.	*Summer.*	*Summer.*
Ray	Carman	Early Rivers
	Greensboro	Mountain Rose
	Niagara	
	Waddell	
Fall.	*Fall.*	*Fall.*
Hale	Belle of Georgia	Foster
	Champion	Late Crawford
	Elberta	
	Heiley	
Late Fall.	*Late Fall.*	*Late Fall.*
	Fox Seedling	Stump
	Iron Mountain	

Recommended for Trial in Home Gardens.	*Commercial.*	*Home Gardens.*
	STRAWBERRIES.	
	Early.	*Early.*
Warren	Abington	
	Barrymore	
	Bubach	
	Marshall	
	Senator Dunlap	
	Warfield	
	Medium.	*Medium.*
Bountiful	Chesapeake	Black Beauty
Manhattan	Glen Mary	North Shore
	Golden Gate	
	Minute Man	
	Sample	
	Late.	*Everbearing.*
	Brandywine	Pan American
	Gandy	Productive
	Wm. Belt	Superb
	PLUMS.	
Summer.	*Summer.*	*Summer.*
McLaughlin	Red June	Abundance
Shiro	Lombard	
Fall.	*Fall.*	*Fall.*
Monarch	Burbank	Bradshaw
	Damon	Golden Drop
	German Prince	Jefferson
	October Purple	Wickson
	Satsuma	Yellow Egg

Recommended for Trial in Home Grounds.	*Commercial.*	*Home Culture.*
	Currants.	
Comet	Fays	Black Naples
London Market	Perfection	White Imperial
Prince Albert	Pomona	White Grape
Victoria	Wilder	
	Gooseberries.	
Bates	Columbian	Chatauqua
Keepsake	Downing	Crown Bob
Red Jacket		Hero of the Nile
		Industry
		Pearl
	Raspberries.	
		Cumberland
	Columbian	Kansas
	Cuthbert	King
	Herbert	Schaffer
	Plum Farmer	Yellow Queen
	Blackberries.	
Iceberg	Agawam	Kittatinny
	Eldorado	Dorchester
	Snyder	
	Quinces.	
	Champion	
	Orange	

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1913.

Midwinter Flower Show.

February 1 and 2.

Winter Apples.— Collection of not less than four varieties:
1st, Elliott & H. W. Moore, $5; 2d, G. V. Fletcher, $4.
Dish of one variety:
1st, G. V. Fletcher, Northern Spy, $3; 2d, G. V. Fletcher, Sutton, $2; 3d, Elliott & H. W. Moore, King, $1.
Winter Pears.— Collection of not less than three varieties:
1st, G. V. Fletcher, $5.
Dish of one variety:
1st, G. V. Fletcher, Dana's Hovey, $3.

Gratuity:—

C. W. Mann, Apples, $5.

Spring Exhibition.

March 14, 15, and 16.

Apples.— For the best collection of Winter Apples, not less than four varieties:
1st, Elliott & H. W. Moore, $5; 2d, C. H. Leach & Son, $4; 3d, G. V. Fletcher, $3.
For the best dish of Winter Apples:
1st, L. F. Priest, McIntosh, $3; 2d, L. F. Priest, Palmer Greening, $2; 3d, C. H. Leach & Son, Baldwin, $1.

Gratuities:—

Turner Hill Farm, collection of Apples, $5.
C. W. Mann, display of Apples, $5.
H. A. Clark, basket of Sutton Apples, $1.

Rose and Strawberry Exhibition.

June 21 and 22.

John A. Lowell Fund.

Strawberries.— For the best collection of ten baskets, of two quarts each, not less than six varieties:
1st, Elliott & H. W. Moore, $25; 2d, G. V. Fletcher, $15.
Six baskets of one quart each, and of six varieties:
1st, G. V. Fletcher, $5; 2d, Elliott & H. W. Moore, $4.

Benjamin H. Pierce Fund.

Two quarts of any variety introduced since 1909:
1st, S. H. Warren, Hub, $4; 2d, S. H. Warren, Indiana, $3.
For the best four quarts of any variety:
1st, G. V. Fletcher, Marshall, $8; 2d, R. B. Horne, Marshall, $6; 3d, S. H. Warren, Warren, $4.
For the best three plates of Strawberries arranged with their foliage, three varieties, twenty-four specimens each:
1st, Elliott & H. W. Moore, $5.
For the best single plate of any variety arranged with foliage, twenty-four specimens:
1st, Elliott & H. W. Moore, $3; 2d, Boston Consumptives' Hospital, $2.

Society's Prizes.

For the best new Strawberry, not yet introduced, four quarts:
Samuel McMullen, Brewer, a Silver Medal.
Two quarts of Abington:
1st, Elliott & H. W. Moore, $3.
Two quarts of Barrymore:
1st, Boston Consumptives' Hospital, $3; 2d, Elliott & H. W. Moore, $2; 3d, G. V. Fletcher, $1.
Two quarts of Black Beauty:
1st, S. H. Warren, $3; 2d, G. V. Fletcher, $2.
Two quarts of Downing's Bride:
1st, Elliott & H. W. Moore, $3.
Two quarts of Glen Mary:
1st, Elliott & H. W. Moore, $3.
Two quarts of Golden Gate:
1st, Boston Consumptives' Hospital, $3; 2d, W. C. Cooper, $2; 3d, Col. Frederick Mason, $1.

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1913.

Midwinter Flower Show.

February 1 and 2.

Winter Apples.— Collection of not less than four varieties:
1st, Elliott & H. W. Moore, $5; 2d, G. V. Fletcher, $4.
Dish of one variety:
1st, G. V. Fletcher, Northern Spy, $3; 2d, G. V. Fletcher, Sutton, $2; 3d, Elliott & H. W. Moore, King, $1.
Winter Pears.— Collection of not less than three varieties:
1st, G. V. Fletcher, $5.
Dish of one variety:
1st, G. V. Fletcher, Dana's Hovey, $3.

Gratuity:—

C. W. Mann, Apples, $5.

Spring Exhibition.

March 14, 15, and 16.

Apples.— For the best collection of Winter Apples, not less than four varieties:
1st, Elliott & H. W. Moore, $5; 2d, C. H. Leach & Son, $4; 3d, G. V. Fletcher, $3.
For the best dish of Winter Apples:
1st, L. F. Priest, McIntosh, $3; 2d, L. F. Priest, Palmer Greening, $2; 3d, C. H. Leach & Son, Baldwin, $1.

Gratuities:—

Turner Hill Farm, collection of Apples, $5.
C. W. Mann, display of Apples, $5.
H. A. Clark, basket of Sutton Apples, $1.

Rose and Strawberry Exhibition.

June 21 and 22.

John A. Lowell Fund.

Strawberries.— For the best collection of ten baskets, of two quarts each, not less than six varieties:
1st, Elliott & H. W. Moore, $25; 2d, G. V. Fletcher, $15.
Six baskets of one quart each, and of six varieties:
1st, G. V. Fletcher, $5; 2d, Elliott & H. W. Moore, $4.

Benjamin H. Pierce Fund.

Two quarts of any variety introduced since 1909:
1st, S. H. Warren, Hub, $4; 2d, S. H. Warren, Indiana, $3.
For the best four quarts of any variety:
1st, G. V. Fletcher, Marshall, $8; 2d, R. B. Horne, Marshall, $6; 3d, S. H. Warren, Warren, $4.
For the best three plates of Strawberries arranged with their foliage, three varieties, twenty-four specimens each:
1st, Elliott & H. W. Moore, $5.
For the best single plate of any variety arranged with foliage, twenty-four specimens:
1st, Elliott & H. W. Moore, $3; 2d, Boston Consumptives' Hospital, $2.

Society's Prizes.

For the best new Strawberry, not yet introduced, four quarts:
Samuel McMullen, Brewer, a Silver Medal.
Two quarts of Abington:
1st, Elliott & H. W. Moore, $3.
Two quarts of Barrymore:
1st, Boston Consumptives' Hospital, $3; 2d, Elliott & H. W. Moore, $2; 3d, G. V. Fletcher, $1.
Two quarts of Black Beauty:
1st, S. H. Warren, $3; 2d, G. V. Fletcher, $2.
Two quarts of Downing's Bride:
1st, Elliott & H. W. Moore, $3.
Two quarts of Glen Mary:
1st, Elliott & H. W. Moore, $3.
Two quarts of Golden Gate:
1st, Boston Consumptives' Hospital, $3; 2d, W. C. Cooper, $2; 3d, Col. Frederick Mason, $1.

Two quarts of Marshall:
1st, R. B. Horne, $3; 2d, Boston Consumptives' Hospital, $2; 3d, G. V. Fletcher, $1.
Two quarts of Minute Man:
1st, Elliott & H. W. Moore, $3.
Two quarts of Sample:
1st, Elliott & H. W. Moore, $3.
Two quarts of Senator Dunlap:
1st, Elliott & H. W. Moore, $3.
Two quarts of any other variety:
1st, W. C. Cooper, Meteor, $3; 2d, W. C. Cooper, Fendall, $2; 3d, W. C. Cooper, Heritage, $1.

CHERRIES.— Two quarts of any red variety:
1st, E. B. Wilder, $3; 2d, J. H. Fletcher, $2.
Two quarts of any black variety:
1st, G. V. Fletcher, $3; 2d, C. B. Travis, $2.
Two quarts of any white, or yellow variety:
1st, Michael Cahalan, $3; 2d, C. B. Travis, $2.

Gratuities:—

Boston Consumptives' Hospital, display of Strawberries, $2.
Mrs. R. Goodnough, Gooseberries, $1.

SWEET PEA EXHIBITION.

JULY 12 AND 13.

Benjamin V. French Fund No. 2.

RASPBERRIES.— Two quarts of Cuthbert:
1st, W. J. Clemson, $3.
Two quarts of any black variety:
1st, Mrs. R. Goodnough, $3.

CHERRIES.— Two quarts of any variety:
1st, G. V. Fletcher, Black Tartarian, $3; 2d, C. S. Smith, Coe's Transparent, $2; 3d, Mrs. R. Goodnough, Black Eagle, $1.

Theodore Lyman Fund, No. 1.

CURRANTS.— Best two quarts of Fay's:
1st, W. J. Clemson, $3; 2d, William Whitman, $2; 3d, Mrs. R. Goodnough, $1.
Best two quarts of Perfection:
1st, Oliver Ames, $3.

Best two quarts of any other red variety:
1st, G. V. Fletcher, Wilder, $3; 2d, William Whitman, Red Cross, $2; 3d, W. J. Clemson, Cherry, $1.
Best two quarts of any white variety:
1st, Oliver Ames, White Queen, $3; 2d, W. G. Kendall, White Grape, $2; 3d, W. J. Clemson, White Queen, $1.
Collection of six baskets, one quart of each, not less than four varieties:
1st, William Whitman, $5.

Society's Prizes.

GOOSEBERRIES.— Collection of six baskets, one quart of each, not less than three varieties:
1st, Dr. W. G. Kendall, $5; 2d, Wilfrid Wheeler, $4; 3d, W. J. Clemson, $3.
Two quarts of Chautauqua:
1st, W. G. Kendall, $3; 2d, H. A. Clark, $2; 3d, W. C. Winter, $1.
Two quarts of Industry:
1st, W. G. Kendall, $3; 2d, Oliver Ames, $2; 3d, W. J. Clemson, $1.
Two quarts of Triumph:
1st, J. S. Chase, $3.
Two quarts of any other variety:
1st, W. G. Kendall, Bates, $3; 2d, H. A. Clark, Columbus, $2; 3d, W. J. Clemson, Columbus, $1.
COLLECTION. Largest and best collection of midsummer fruits, arranged for effect with their own foliage:
1st, G. V. Fletcher, $8; 2d, Peter Andersen, $6.

Gratuities:—

William Whitman, collection of Currants, $2;
W. C. Winter, Peaches, $1.

GLADIOLUS AND PHLOX EXHIBITION.

AUGUST 9 AND 10.

APPLES.— Duchess of Oldenburg:
1st, L. F. Priest, $3; 2d, H. A. Clark, $2.
Red Astrachan:
1st, L. F. Priest, $3; 2d, Michael Cahalan, $2; 3d, M. S. Wheeler, $1.
Sweet Bough:
1st, G. V. Fletcher, $3; 2d, C. B. Travis, $2.
Yellow Transparent:
1st, L. F. Priest, $3; 2d, William Downs, $2.

Williams:
1st, J. H. Fletcher, $3; 2d, L. F. Priest, $2; 3d, H. A. Clark, $1.

PEARS.— Clapp's Favorite:
1st, G. V. Fletcher, $3; 2d, W. G. Kendall, $2; 3d, H. A. Clark, $1.

Any other variety:
1st, W. C. Winter, Beurre Giffard, $3; 2d, Mrs. M. W. Chadbourne, Rostiezer, $2; 3d, F. W. Dahl, Dearborn Seedling, $1.

PEACHES.— Greensboro:
1st, Wilfrid Wheeler, $3; 2d, F. H. Brown, $2; 3d, Mrs. R. Goodnough, $1.

Waddell:
1st, F. H. Brown, $3.

Any other variety:
1st, G. V. Fletcher, Mayflower, $3; 2d, H. A. Clark, Mayflower, $2; 3d, F. H. Brown, Fitzgerald, $1.

Six specimens of one variety:
1st, W. C. Winter, $5.

PLUMS, Japanese.— Abundance:
1st, W. T. Hutchinson $3; 2d, W. G. Kendall, $2; 3d, W. C. Winter, $1.

Burbank:
1st, Col. Frederick Mason, $3; 2d, Mrs. A. A. Warburton, $2; 3d, W. T. Hutchinson, $1.

Any other variety:
1st, M. S. Wheeler, Red June, $3; 2d, W. G. Kendall, Red June, $2; 3d, Col. Frederick Mason, Chabot, $1.

BLACKBERRIES.— Two quarts of any variety:
1st, H. A. Clark, $3; 2d, Mrs. M. W. Chadbourne, $2; 3d, Mrs. E. M. Gill, $1.

Gratuities:—

William Jennison, cultivated Blueberries, $5.
S. H. Warren, Everbearing Strawberries, $1.
Mrs. R. Goodnough, basket of fruit, $5.
New Hampshire College, collection of new hybrid Melons, a Silver Medal
T. E. Proctor, Princess of Wales Peaches, Honorable Mention.

AUGUST 30.

Gratuity:—

E. R. Farrar, collection of Grapes, $3.

Dahlia and Fruit Exhibition.

September 12, 13, and 14.

John S. Farlow Newton Horticultural Society Fund.

Foreign Grapes.— Collection of not less than four varieties, two bunches of each:
1st, T. E. Proctor, $25.

Theodore Lyman Fund No. 1.

Apples.— For the best collection of six varieties of fall apples, specimens to be ripe and twelve of each:
1st, E. E. Cole, $10.

Benjamin V. French Fund No. 1.

Peaches.— For the largest and best collection of native peaches:
1st, H. A. Clark, $10; 2d, A. F. Estabrook, $6; 3d, G. V. Fletcher, $4.

Marshall P. Wilder Fund.

Pears.— Bartlett:
1st, Elbridge Torrey, $3; 2d, F. W. Dahl, $2; 3d, Mrs. M. W. Chadbourne, $1.
Clapp's Favorite:
1st, Elbridge Torrey, $3; 2d, G. V. Fletcher, $2; 3d, A. F. Estabrook, $1.
Any other variety:
1st, E. B. Wilder, Brandywine, $3; 2d, W. G. Kendall, Souvenir du Congres, $2; 3d, E. B. Wilder, President, $1.

Society's Prizes.

Apples.— Gravenstein:
1st, E. E. Cole, $3; 2d. G. V. Fletcher, $2; 3d, M. S. Wheeler, $1.
Maiden Blush:
1st, W. C. Winter, $3.
Porter:
1st, G. F. Wheeler, $3.
Wealthy:
1st, H. A. Clark, $3.

Any other variety:
1st, J. H. Fletcher, Williams, $3; 2d, W. C. Winter, McIntosh, $2; 3d, E. E. Cole, Alexander, $1.

MELONS.— Honey Drop; three specimens:
1st, A. F. Estabrook, $3; 2d, Albert Anderson, $2; 3d, Col. Frederick Mason, $1.

Any other variety; three specimens:
1st, Col. Frederick Mason, Osage, $3; 2d, Mrs. Frederick Ayer, Montreal Nutmeg, $2; 3d, Mrs. A. A. Warburton, Emerald Gem, $1.

WATERMELONS.— Two specimens:
1st, Col. Frederick Mason, $3.

PEACHES.— Belle of Georgia:
1st, Wilfrid Wheeler, $3; 2d, H. A. Clark, $2.

Carman:
1st, Wilfrid Wheeler, $3; 2d, H. A. Clark, $2; 3d, G. V. Fletcher, $1.

Champion:
1st, H. A. Clark, $3; 2d, G. V. Fletcher, $2; 3d, Wilfrid Wheeler, $1.

Elberta:
1st, Wilfrid Wheeler, $3; 2d, G. F. Wheeler, $2; 3d, F. W. Dahl, $1.

Niagara:
1st, Mrs. R. Goodnough, $3.

Oldmixon:
1st, H. A. Clark, $3; 2d, M. S. Wheeler, $2; 3d, A. F. Estabrook, $1.

Any other variety:
1st, F. W. Dahl, Crawford, $3; 2d, W. T. Hutchinson, Capt. Ede, $2; 3d, W. G. Kendall, Chair's Choice, $1.

PLUMS.— Collection of not less than four varieties other than Japanese, twelve specimens of each:
1st, G. V. Fletcher, $5; 2d, W. T. Hutchinson, $3.

Single plate of any variety other than Japanese:
1st, G. V. Fletcher, Yellow Egg, $3; 2d, W. G. Kendall, McLaughlin, $2; 3d, W. T. Hutchinson, Bradshaw, $1.

JAPANESE PLUMS.— Collection of not less than four varieties, twelve specimens of each:
1st, M. S. Wheeler, $5.

Single plate of any variety:
1st, Mrs. A. A. Warburton, Burbank, $3; 2d, Mrs. A. A. Warburton, Wickson, $2; 3d, M. S. Wheeler, October Purple, $1.

Marshall P. Wilder Fund.

GRAPES.— Concord, twelve bunches:
1st, E. R. Farrar, $4; 2d, Wilfrid Wheeler, $3.

Niagara, twelve bunches:
1st, E. R. Farrar, $4; 2d, J. Bauernfeind, $3; 3d, C. F. Hayward, $2.

Worden:
1st, E. R. Farrar, $4.

Society's Prizes.

GRAPES.— For the best collection of hardy grapes, not less than six varieties of three bunches each:
1st, Col. Frederick Mason, $10; 2d, J. Bauernfeind, $8; 3d, C. W. Libby, $6.

Six bunches of Agawam:
1st, C. W. Libby, $3.

Six bunches of Brighton:
1st, E. R. Farrar, $3; 2d, C. W. Libby, $2; 3d, J. Bauernfeind, $1.

Six bunches of Campbell's Early:
1st, J. Bauernfeind, $3.

Six bunches of Delaware:
1st, E. R. Farrar, $3; 2d, J. S. Chase, $2; 3d, Col. Frederick Mason, $1.

Six bunches of Green Mountain:
1st, Wilfrid Wheeler, $3; 2d, E. R. Farrar, $2; 3d, G. W. Page, $1.

Six bunches of Herbert:
1st, J. Bauernfeind, $3; 2d, C. W. Libby, $2.

Six bunches of Isabella:
1st, C. W. Libby, $3.

Six bunches of Lindley:
1st, C. W. Libby, $3.

Six bunches of Moore's Diamond:
1st, Col. Frederick Mason, $3; 2nd, Wilfrid Wheeler, $2; 3d, C. W. Libby, $1.

Six bunches of Moore's Early:
1st, E. R. Farrar, $3; 2d, C. W. Libby, $2.

Six bunches of Prentiss:
1st, J. S. Chase, $3.

Six bunches of Salem:
1st, E. R. Farrar, $3; 2d, J. Bauernfeind, $2.

Six bunches of Wilder:
1st, J. S. Chase, $3.

Any other variety:
1st, C. W. Libby, McPike, $3; 2d, Mrs. R. Goodnough, Worden, $2; 3d, C. W. Libby, Lucile, $1.

COLLECTION.— For the largest collection of seasonable fruit arranged for effect with foliage, to cover a space not larger than four by six feet:
1st, H. A. Clark, $15; 2d, G. V. Fletcher, $12; 3d, Mrs. M. W. Chadbourne, $10.

Gratuities:—

Wilfrid Wheeler, collection of Peaches, $2.
Mrs. Fritz Schulz, collection of Plums, $1.
" " " English Walnuts, $1.

Vegetable Exhibition.

October 4 and 5.

Gratuities:—

D. R. Craig, Quinces, $1.
Mrs. N. P. Martin, basket of Grapes, $1.
D. R. Craig, collection of fruit, $2.
E. S. Martin, " " " $2.
Mrs. N. P. Cutler, " " " $1.

Special Exhibition of Fruits.

November 12, 13, 14, 15, and 16.

Apples. Plate Exhibits.

Group One.

Baldwin:
1st, T. K. Winsor, $5; 2d, Alden Derby, $4; 3d, F. W. Swain, $3; 4th J. E. Schlemmer, $2; 5th, A. A. Moses, $1.

Gravenstein:
1st, T. K. Winsor, $5; 2d, A. B. Howard & Son, $4; 3d, F. E. Whiting, $3; 4th, Alden Derby, $2; 5th, G. H. Sprague, $1.

McIntosh:
1st, Alden Derby, $5; 2d, J. E. Schlemmer, $4; 3d, A. C. Wakefield, $3; 4th, L. F. Priest, $2; 5th, Goodwin Warner, $1.

Northern Spy:
1st, W. H. Conant, $5; 2d, E. E. Brown, $4; 3d, J. M. Schwartz, $3; 4th, E. E. Cole, $2; 5th, G. H. Sprague, $1.

Rhode Island Greening:
1st, W. G. Willcutt, $5; 2d, Alden Derby, $4; 3d, A. B. Howard & Son, $3; 4th, L. H. Warncke, $2; 5th, Chase Farm, $1.

Roxbury Russet:
1st, L. F. Priest, $5; 2d, E. E. Brown, $4; 3d, M. S. Wheeler, $3; 4th, Oxbow Farm, $2; 5th, Clement & Taylor, $1.

Wealthy:
1st, Alden Derby, $5; 2d, L. H. Warncke, $4; 3d, O. W. Amidon, $3; 4th, J. J. Erwin, $2; 5th, J. M. Burt & Son, $1.

Group Two.

Esopus Spitzenburg:
1st, L. H. Warncke, $4; 2d, W. F. Ranney, $3; 3d, A. P. Clifford, $2; 4th, A. B. Howard & Son, $1.

Fall Pippin:
1st, W. H. Conant, $4; 2d, O. W. Amidon $3; 3d, E. E. Cole, $2; 4th, N. S. Winsor, $1.
Fameuse:
1st, H. L. Conant, $4; 2d, T. K. Winsor, $3; 3d, W. F. Ranney, $2; 4th, N. S. Winsor, $1.
Grimes Golden:
1st, E. E. Brown, $4; 2d, Oxbow Farm, $3; 3d, A. A. Halladay & Sons, $2.
Hubbardston:
1st, N. S. Warner, $4; 2d, O. W. Amidon, $3; 3d, L. F. Priest, $2; 4th, W. F. Ranney, $1.
King:
1st, O. W. Amidon, $4; 2d, J. E. Schlemmer, $3; 3d, Bay Road Fruit Farm, $2; 4th, W. B. Parker, $1.
Maiden Blush:
1st, T. L. Perkins, $4; 2d, Bay Road Fruit Farm, $3; 3d, E. E. Cole, $2; 4th A. B. Howard & Son, $1.
Nodhead:
1st, Etta F. Whiting, $4; 2d, H. A. Clark, $3.
Oldenburg:
1st, L. F. Priest, $4.
Palmer Greening:
1st, H. C. Fuller, $4; 2d, F. H. Farmer, $3; 3d, Alden Derby, $2; 4th, H. R. Foster, $1.
Red Astrachan:
1st, L. F. Priest, $4; 2d, A. B. Howard & Son, $3; 3d, W. M. Davis, $2.
Red Canada:
1st, E. E. Brown, $4; 2d, A. B. Howard & Son, $3; 3d, A. C. Wakefield, $2; 4th, H. B. Buell, $1.
Sutton:
1st, E. M. Bruce, $4; 2d, W. F. Ranney, $3; 3d, Turner Hill Farm, $2; 4th, T. H. & L. C. Root, $1.
Yellow Bellflower:
1st, Clement & Taylor, $4; 2d, A. A. Halladay & Sons, $3; 3d, C. W. Cummings, $2; 4th, W. H. Stone, $1.
Yellow Transparent:
1st, L. F. Priest, $4.
Wagener:
1st, F. W. Swain, $4; 2d, Turner Hill Farm, $3; 3d, W. G. Conant, $2; 4th, Mrs. A. S. Burrows, $1.
Williams:
1st, L. F. Priest, $4; 2d, John Grubb, $3.

Group Three.

Bailey Sweet:
1st, Etta F. Whiting, $3; 2d, W. G. Conant, $2; 3d, A. B. Howard & Son, $1.

Black Gilliflower:
1st, H. R. Foster, $3; 2d, T. K. Winsor, $2; 3d, O. W. Amidon, $1.

Blue Pearmain:
1st, Alden Derby, $3; 2d, L. K. Lee, $2; 3d, W. G. Conant, $1.

Chenango:
1st, W. F. Beaupain, $3; 2d, Arthur Raymond, $2; 3d, E. E. Brown, $1.

Golden Russet:
1st, E. S. Boss, $3; 2d, H. A. Lamb, $2; 3d, A. A. Halladay & Son, $1.

Jonathan:
1st, Alden Derby, $3; 2d, J. E. Schlemmer, $2; 3d, J. M. Burt & Son, $1.

Lady:
1st, L. H. Warncke, $3; 2d, E. E. Brown, $2.

Milding:
1st, Franklin Pierce, $3; 2d, L. K. Lee, $2.

Newtown Pippin:
1st, H. R. Foster, $3; 2d, F. H. Farmer, $2; 3d, W. C. Winter, $1.

Opalescent:
1st, Clement & Taylor, $3; 2d, J. L. C. Harrington, $2; 3d, A. A. Halladay & Sons, $1.

Peck Pleasant:
1st, L. H. Warncke, $3; 2d, T. K. Winsor, $2; 3d, N. S. Winsor, $1.

Porter:
1st, J. M. Schwartz, $3; 2d, T. K. Winsor, $2; 3d, T. L. Perkins, $1.

Pound Sweet:
1st, A. A. Halladay & Sons, $3; 2d, F. E. Whiting, $2; 3d, G. V. Fletcher, $1.

Rolfe:
1st, L. F. Priest, $3; 2d, W. G. Conant, $2; 3d, J. J. Erwin, $1.

Shiawassee:
1st, James Winsor, $3; 2d, H. W. Littlefield, $2.

Seek No Further:
1st, A. B. Howard & Son, $3; 2d, O. W. Amidon, $2; 3d, A. A. Halladay & Sons, $1.

Tolman Sweet:
1st, G. H. Sprague, $3; 2d, W. G. Conant, $2; 3d, W. B. Parker, $1.

Twenty Ounce:
1st, O. W. Amidon, $3; 2d, W. F. Ranney, $2; 3d, H. A. Clark, $1.

Winter Banana:
1st, A. A. Halladay & Sons, $3; 2d, Goodwin Warner, $2.

Group Four.

Alexander:
1st, H. W. Littlefield, $2; 2d, E. E. Cole, $1.
Ben Davis:
1st, T. K. Winsor, $2; 2d, L. H. Warncke, $1.
Black Oxford:
1st, E. E. Conant, $2; 2d, J. E. Pontin, $1.
Delicious:
1st, E. E. Brown, $2; 2d, H. F. Gowell, $1.
Fallawater:
1st, H. R. Foster, $2; 2d, T. B. W. Stetson, $1.
Green Sweet:
1st, Ralph Davol, $2.
Isham Sweet:
1st, A. A. Halladay & Son, $2.
Pewaukee:
1st, J. E. Schlemmer, $2; 2d, W. G. Conant, $1.
Red Bietigheimer:
1st, N. S. Winsor, $2; 2d, L. H. Warncke, $1.
Red Russet:
1st, H. A. Thayer, $2.
Salome:
1st, T. K. Winsor, $2; 2d, N. S. Winsor, $1.
St. Lawrence:
1st, T. K. Winsor, $2.
Stark:
1st, H. A. Thayer, $2; 2d, N. S. Winsor, $1.
Walbridge:
1st, A. B. Howard & Son, $2.
Wolf River:
1st, H. W. Littlefield, $2; 2d, H. R. Foster, $1.
Any other variety:
1st, H. B. Buell, Rome Beauty, $3; 2d, H. A. Thayer, Boiken, $2; 3d, E. E. Brown, Gloria Mundi, $1.
Crab Apples, Hyslop, twenty-four specimens:
1st, L. F. Priest, $2; 2d, J. M. Schwartz, $1.

Grange Exhibits or Local Cooperative Fruit Growers' Associations.

For the best plate of apples exhibited by any Grange or Association in New England, not less than fifteen varieties, one plate of each:
1st, Oxford Bears, $35; 2d, Wachusett Grange, $30; 3d, Union Grange, $20.

Individual Exhibits.

For the largest and best exhibit of apples by an individual, not less than fifteen varieties, one plate of each:
1st, L. F. Priest, $25; 2d, Turner Hill Farm, $15; 3d, A. B. Howard & Son, $10.

For the best six varieties of winter apples, five specimens of each:
1st, O. W. Amidon, $15; 2d, E. E. Cole, $10; 3d, A. B. Howard & Son, $8.

For the best five varieties made up from Group One:
1st, Alden Derby, $15; 2d, W. H. Conant, $10; 3d, Turner Hill Farm, $8.

For the most tastefully arranged hamper or basket of New England grown apples, not more than two pecks nor less than one peck:
1st, Mrs. R. Goodnough, $15; 2d, F. H. Farmer, $10; 3d, G. V. Fletcher, $5.

For the best collection of New England grown apples arranged for decorative effect:
1st, E. M. Bruce, $25; 2d, A. B. Howard & Son, $15; 3d, Mrs. R. Goodnough, $10.

Pears and Other Fruits.

Pears.— For the best collection of pears, not more than twelve plates of twelve specimens each, and not less than six varieties:
1st, F. W. Dahl, $10; 2d, G. V. Fletcher, $8; 3d, A. B. Howard & Son, $6.

Angouleme:
1st, F. W. Dahl, $3; 3d, Elbridge Torrey, $1.

Anjou:
1st, F. W. Dahl, $3; 2d, A. F. Estabrook, $2; 3d, E. B. Wilder, $1.

Bosc:
1st, W. G. Kendall, $3; 2d, G. V. Fletcher, $2.

Clairgeau:
1st, A. B. Howard & Son, $3; 2d, F. W. Dahl, $2.

Comice:
1st, G. V. Fletcher, $3.

Dana's Hovey:
1st, W. Heustis & Son, $3; 2d, E. L. Smith, $2; 3d, J. M. Schwartz, $1.

Lawrence:
1st, F. W. Dahl, $3; 2d, E. B. Wilder, $2; 3d, J. Bauernfeind, $1.

Seckel:
1st, C. A. Moore, $3; 2d, J. Bauernfeind, $2; 3d, G. V. Fletcher, $1.

Sheldon:
1st, J. Bauernfeind, $3; 2d, G. V. Fletcher, $2; 3d, C. A. Moore, $1.

Urbaniste:
1st, F. W. Dahl, $3.
Vicar:
1st, E. B. Wilder, $3; 2d, F. W. Dahl, $2; 3d, J. M. Schwartz, $1.
Winter Nelis:
1st, A. B. Howard & Son, $3.
Any other variety:
1st, E. B. Wilder, $3; 2d, E. E. Brown, $2; 3d, F. W. Dahl, $1.

QUINCES.— Any variety:
1st, C. G. Bliss, $5; 2d, G. V. Fletcher, $4; 3d, J. M. Schwartz, $3; 4th, W. C. Winter, $2.

CRANBERRIES.— Collection of not less than four varieties, half-peck of each:
1st, Z. H. Jenkins, $20; 2d, A. D. Makepeace & Co., $15; 3d, Finney Bros., $10.
Half-peck of any variety:
1st, F. D. Underwood, $5; 2d, Z. H. Jenkins, $4.

Special Prize for New Fruits.

Benjamin H. Pierce Fund.

For the best seedling apple of merit, twenty-five specimens:
N. S. Winsor, $25.

Gratuities:—

Massachusetts Agricultural Experiment Station, Cranberry Sub-Station. collection of Cranberries, $10.
C. G. Bliss, tastefully arranged basket of fruit, $5.
Mrs. M. W. Chadbourne, display of fruit, $2.

REPORT OF THE COMMITTEE ON VEGETABLES FOR THE YEAR 1913.

By Duncan Finlayson, Chairman.

The Committee on Vegetables for the year 1913 begs to report that the various exhibitions of vegetables held at Horticultural Hall during the past year were in every way up to the high standard of previous years.

The exhibition on February 1 had several good specimens for this season of the year.

The show on March 14, 15, 16 brought out very creditable displays and the mushrooms and lettuce were of high grade.

The May 17–18 show was fully up to former years. The asparagus at this exhibition was of the finest quality.

The June 7 show was of high order and all the classes were well contested.

The June 21 exhibition brought out very fine specimens and the peas at this show were of the finest quality.

The July 12 show brought out some excellent competition in the collection class.

At the August 10 show all the classes were well contested. Some excellent sweet corn and onions were shown at this exhibition.

The October 4–5 exhibition, the largest of the season, brought out some of the finest exhibits ever staged at Horticultural Hall. Special mention is due Col. Frederick Mason of Taunton for the splendid exhibit put up by his superintendent, Edwin L. Lewis. All the other exhibits were of very high order, and the entries in most cases were so uniformly of excellent quality that we found it very difficult to decide as to which was the most deserving of the first premium.

The Society offered this year a Silver Medal for the best new vegetable shown in the year 1913; also a Silver Medal for the most improved vegetable shown in the year 1913. These classes brought out several new and meritorious exhibits.

Col. Frederick Mason of Taunton showed a new potato named Seneca Beauty, for which Honorable Mention was awarded. Mr. Oliver Ames of North Easton showed a new seedling potato under a number which received Honorable Mention. Mr. Norris F. Comley of Lexington showed a new cucumber, a cross between White Spine and Telephone, for which he was awarded Honorable Mention. Mr. George Page of West Newton exhibited tomato Imperial Wonder, an improvement on the old Italian variety. Mr. A. W. Preston of Swampscott exhibited a new cucumber named King George. It was awarded a vote of thanks. The same exhibitor showed chicory Giant of Milan, for which he was awarded Honorable Mention. Mr. Norris F. Comley of Lexington won the Society's Silver Medal for the best new vegetable shown in the year 1913 with his new tomato Terrace Hall. Elliott and H. Ward Moore of Worcester were awarded the Society's Silver Medal for the best improved vegetable shown in the year 1913, for the potato Drought Proof.

We note with pleasure the interest and care taken by the exhibitors in selecting their various exhibits; also the tasteful arrangement of their exhibits on the tables.

We also note with pleasure that several new exhibitors were added to the list this year, and hope that with the backing of the Society the list will be made larger each year.

We are sorry to note that the large vegetable growers do not display their products before the public at Horticultural Hall to the extent they should, but we are glad that the amateur and private gardeners are taking keener interest in the vegetable department each year.

The appropriation for prizes for the year 1913 was $1,070, of which was expended $847, leaving a balance of $223.

A detailed list of the awards made during the year is appended to this report.

DUNCAN FINLAYSON
WILLIAM N. CRAIG
HENRY M. HOWARD
Committee on Vegetables.

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1913.

Midwinter Exhibition.

February 1 and 2.

William J. Walker Fund.

Rhubarb.— Twelve stalks:
1st, E. W. Campbell, $3.
Tomatoes.— Twelve specimens:
1st, A. W. Preston, $3.
Collection.— Forced vegetables, not less than four varieties:
1st, A. W. Preston, $8.

Spring Exhibition.

March 14, 15, and 16.

Lettuce.— Four heads:
1st, G. D. Moore, $3; 2d, J. J. Lyons, $2; 3d, J. W. Stone, $1.
Mushrooms.— Twelve specimens:
1st, Mrs. C. G. Weld, $4; 2d, A. W. Preston, $3.
Radishes.— Four bunches of twelve:
1st, J. W. Stone, $3.
Tomatoes.— Twelve specimens:
1st, A. W. Preston, Rockford, $3; 2d, A. W. Preston, Fonthill, $2.

Gratuities:—

H. R. Comley, variegated Kale, $1.
Mrs. M. W. Chadbourne, Jerusalem Artichokes, $3.
Frank Wheeler, Rhubarb, $5.
D. R. Craig, " $3.
J. W. Stone, " $2.
Hittinger Fruit Co., market baskets of Lettuce and Beets, $5.

May Exhibition.

May 17 and 18.

Theodore Lyman Fund No. 2.

Asparagus.— Four bunches, twelve stalks each:
1st, Oliver Ames, $5; 2d, Mrs. Frederick Ayer, $3.

BEETS.— Twelve specimens, open culture:
1st, W. Heustis & Son, $3.
CARROTS.— Four bunches:
1st, W. Heustis & Son, $3.
LETTUCE.— Four heads:
1st, Oliver Ames, $3.
RADISHES.— Four bunches:
1st, Oliver Ames, $3; 2d, W. Heustis & Son, $2.
TOMATOES.— Twelve specimens:
1st, Oliver Ames, $3.
COLLECTION OF VEGETABLES.— Grown in 1913, not less than four varieties:
1st, Oliver Ames, $5; 2d, A. W. Preston, $3.

Gratuities:—

Oliver Ames, Rhubarb, $2.
William Whitman, Parsley, $2.
W. Heustis & Son, collection of vegetables, $3.

PEONY AND RHODODENDRON EXHIBITION.

JUNE 7 AND 8.

Theodore Lyman Fund.

ASPARAGUS.— Four bunches, twelve stalks each:
1st, W. J. Clemson, $5; 2d, Oliver Ames, $3; 3d, Mrs. Frederick Ayer, $2.
BEANS.— String variety, forced, one quart:
1st, Mrs. Frederick Ayer, $2.
BEETS.— Twelve specimens, open culture:
1st, W. J. Clemson, $3; 2d, W. Heustis & Son, $2.
CARROTS.— Four bunches:
1st, W. Heustis & Son, $3.
CUCUMBERS.— Four:
1st, W. J. Clemson, $3; 2d, Estate of J. G. Coolidge, $2; 3d, J. J. Lyons, $1.
LETTUCE.— Four heads:
1st, W. Heustis & Son, $3; 2d, W. Heustis & Son, $2; 3d, W. J. Clemson, $1.
RADISHES.— Four bunches:
1st, W. Heustis & Son, $3.
TOMATOES.— Twelve specimens:
1st, W. J. Clemson, $3; 2d, W. J. Clemson, $2; 3d, Estate of J. G. Coolidge, $1.

COLLECTION OF VEGETABLES.— Grown in 1913, not less than four varieties:
1st, Oliver Ames, $5; 2d, W. Heustis & Son, $3; 3d, Estate of J. G. Coolidge, $2.

Gratuities:—

Oliver Ames, Cauliflower and Rhubarb, $2.
Francis Skinner, Lettuce and Radishes, $2.

JUNE 14.

Gratuity:—

W. Heustis & Son, collection of vegetables, $3.

ROSE AND STRAWBERRY EXHIBITION.

JUNE 21 AND 22.

Theodore Lyman Fund No. 2.

BEETS.— Twelve, open culture:
1st, Col. Frederick Mason, $3; 2d, W. J. Clemson, $2.
CABBAGES.— Four specimens:
1st, W. Heustis & Son, $3; 2d, W. Heustis & Son, $2.
CUCUMBERS.— Four specimens:
1st, W. J. Clemson, $3; 2d, Estate of J. G. Coolidge, $2.
LETTUCE.— Four heads:
1st, Walter Hunnewell, $3; 2d, Oliver Ames, $2.
PEAS.— Gradus or Thomas Laxton, fifty pods:
1st, F. W. Sargent, $3; 2d, Walter Hunnewell, $2.
Sutton's Excelsior, fifty pods:
1st, Col. Frederick Mason, $3; 2d, Walter Hunnewell, $2.
Any other variety, fifty pods:
1st, Walter Hunnewell, $3; 2d, Col. Frederick Mason, $2.
Collection of not less than three varieties, fifty pods each:
1st, Walter Hunnewell, $5; 2d, Mrs. A. A. Warburton, $3.
COLLECTION OF VEGETABLES.— Not less than six varieties, tastefully arranged:
1st, W. J. Clemson, $10; 2d, Oliver Ames, $8; 3d, W. Heustis & Son, $6.

Gratuities:—

Edward Lynch, Rhubarb, $2.
A. W. Preston, Fonthill Tomatoes, $2.
W. J. Clemson, Tomatoes, $2.
Mrs. A. A. Warburton, collection of vegetables, $2.

Sweet Pea Exhibition.

July 12 and 13.

William J. Walker Fund.

Collection of Vegetables.— Not less than eight varieties, tastefully arranged.

1st, W. J. Clemson, $15; 2d, Col. Frederick Mason, $10; 3d, W. Heustis & Son, $8.

Gratuities:—

N. F. Comley, collection of Tomatoes, $6.
Mrs. Frederick Ayer, Tomatoes, $2.
Oliver Ames, " $1.
William Whitman, collection of vegetables, $3.
Mrs. A. A. Warburton, " " " $3.
F. W. Sargent, " " " $2.

Gladiolus and Phlox Exhibition.

August 9 and 10.

Beans.— Two quarts, shelled, not Lima:

1st, Mrs. Frederick Ayer, $3.

Peppers.— Twelve specimens, Bell or Bull Nose:

1st, Col. Frederick Mason, $3.

Twelve specimens, any other variety:

1st, Oliver Ames, $3; 2d, Col. Frederick Mason, $2; 3d, Col. Frederick Mason, $1.

Squash.— Marrow, three specimens:

1st, Col. Frederick Mason, $3; 2d, F. W. Sargent, $2; 3d, Mrs. A. A. Warburton, $1.

Sweet Corn.— Twelve ears, Crosby:

1st, Col. Frederick Mason, $3; 2d, Mrs. A. A. Warburton, $2.

Twelve ears, any other variety:

1st, Col. Frederick Mason, $3; 2d, F. W. Sargent, $2.

Onions.— Twelve specimens:

1st, W. J. Clemson, $4; 2d, A. W. Preston, $3; 3d, A. W. Preston, $2.

Collection of Vegetables.— Not less than eight varieties, decorative arrangement to be considered:

1st, Oliver Ames, $10; 2d, Col. Frederick Mason, $8; 3d, A. W. Preston, $6.

Collection, not less than four varieties:
1st, W. J. Clemson, $5; 2d, Mrs. A. A. Warburton, $4; 3d, W. Heustis & Son, $3.

Gratuities:—

Mrs. A. A. Warburton, Vegetable Marrows, $2.
Mrs. Frederick Ayer, unshelled Beans, $1.
A. W. Preston, Cucumber King George, $1.
Mrs. A. A. Warburton, Rhubarb and Mushrooms, $1.
F. W. Sargent, collection, $5.
William Whitman, " $2.

Dahlia and Fruit Exhibition.

September 12, 13, and 14.

Gratuities:—

William Whitman, collection of vegetables, $4.
Mrs. A. A. Warburton " " " $2.
Mrs. V. V. Hersey, Tomato Boston Market, Honorable Mention.
Baker Farm, Tomato Sterling Castle, Honorable Mention.

Vegetable Exhibition.

October 4 and 5.

Benjamin V. French Fund No. 2.

Collection of Vegetables.— Twelve kinds, not more than one variety of a kind, tastefully arranged:
1st, Col. Frederick Mason, $25; 2d, Oliver Ames, $15; 3d, F. W. Sargent, $10.
Six kinds, not more than one variety of a kind:
1st, A. W. Preston, $15; 2d, J. A. Nixon, $10; 3d, W. J. Clemson, $8.
Six kinds, distinct species (for cottagers only):
1st, Michael Cahalan, $8; 2d, Mrs. A. A. Warburton, $6; 3d, D. L. Fiske, $4.

William J. Walker Fund.

Beans.— Lima, any variety, four quarts, pods:
1st, Oliver Ames, $4; 2d, W. J. Clemson, $3; 3d, A. W. Preston, $2.
Lima, any variety, shelled, one quart (for cottagers only):
1st, Michael Cahalan, $3; 2d, Mrs. A. A. Warburton, $2.

BEETS.— Any round variety, twelve roots:
1st, Col. Frederick Mason, $3; 2d, Oliver Ames, $2; 3d, Oliver Ames, $1.

Any round variety, six roots (for cottagers only):
1st, Michael Cahalan, $3; 2d, Mrs. A. A. Warburton, $2; 3d, J. A. Nixon, $1.

Chard, three plants:
1st, Oliver Ames, $3; 2d, Col. Frederick Mason, $2; 3d, F. W. Sargent, $1.

BRUSSELS SPROUTS.— Four quarts:
1st, A. W. Preston, $4; 2d, Mrs. J. L. Gardner, $3; 3d, Oliver Ames, $2.

Society's Prizes.

CABBAGE.— Any ball head variety, green, four heads:
1st, D. R. Craig, $4; 2d, William Whitman, $3; 3d, Col. Frederick Mason, $2.

Any flat head variety, four heads:
1st, Mrs. J. L. Gardner, $4; 2d, Mrs. J. L. Gardner, $3; 3d, Col. Frederick Mason, $2.

Savoy, four heads:
1st, Mrs. J. L. Gardner, $4; 2d, Mrs. J. L. Gardner, $3; 3d, William Whitman, $2.

Red, four heads:
1st, Col. Frederick Mason, $4; 2d, William Whitman, $3; 3d, Michael Cahalan, $2.

Any green variety, three heads (for cottagers only):
1st, Michael Cahalan, $4; 2d, Michael Cahalan, $3; 3d, J. A. Nixon, $2.

CARROTS.— Danvers, twelve roots:
1st, Col. Frederick Mason, $4; 2d, Col. Frederick Mason, $3; 3d, Oliver Ames, $2.

Any red or orange variety longer than Danvers, twelve roots:
1st, Col. Frederick Mason, $4; 2d, Oliver Ames, $3; 3d, Mrs. A. A. Warburton, $2.

CAULIFLOWER.— Three heads:
1st, Col. Frederick Mason, $4; 2d, W. J. Clemson, $3; 3d, Col. Frederick Mason, $2.

CELERY.— Boston Market, four heads:
1st, Col. Frederick Mason, $3; 2d, D. R. Craig, $2; 3d, W. Heustis & Son, $1.

Giant Pascal, four heads:
1st, Col. Frederick Mason, $3; 2d, Mrs. A. A. Warburton, $2; 3d, D. R. Craig, $1.

Paris Golden or Golden Rose, four heads:
1st, Col. Frederick Mason, $3; 2d, Mrs. A. A. Warburton, $2; 3d, J. A. Nixon, $1.
White Plume, four heads:
1st, J. A. Nixon, $3; 2d, Mrs. H. R. Johnstone, $2; 3d, D. R. Craig, $1.
Any pink or red variety other than Golden Rose, four heads:
1st, F. W. Sargent, $3.

Egg Plant.— Four specimens:
1st, Oliver Ames, $3; 2d, Edward Gowing, $2; 3d, Col. Frederick Mason, $1.

Kohl-Rabi.— Six roots:
1st, Mrs. A. A. Warburton, $3; 2d, Col. Frederick Mason, $2; 3d, Oliver Ames, $1.

Lettuce.— Cos or Romaine, six specimens:
1st, Col. Frederick Mason, $3; 2d, Mrs. A. A. Warburton, $2.
Round headed, six specimens:
1st, Oliver Ames, $3; 2d, Col. Frederick Mason, $2; 3d, Mrs. A. A. Warburton, $1.

Onions.— Ailsa Craig, twelve specimens:
1st, Mrs. Lester Leland, $5; 2d, J. A. Nixon, $3; 3d, W. J. Clemson, $2.
Danvers, twelve specimens:
1st, Oliver Ames, $5; 2d, Mrs. H. R. Johnstone, $3; 3d, J. A. Nixon, $2.
Any red variety, twelve specimens:
1st, Oliver Ames, $5; 2d, J. A. Nixon, $3; 3d, W. J. Clemson, $2.

Parsnips.— Twelve specimens:
1st, W. J. Clemson, $4; 2d, W. Heustis & Son, $3; 3d, Col. Frederick Mason, $2.

Peppers.— Twelve specimens:
1st, Col. Frederick Mason, $4; 2d, Oliver Ames, $3; 3d, Col. Frederick Mason, $2.

Potato.— Early Rose type, twelve specimens:
1st, Col. Frederick Mason, $5; 2d, Col. Frederick Mason, $4; 3d, Oliver Ames, $3.
Green Mountain type, twelve specimens:
1st, D. R. Craig, $5; 2d, W. J. Clemson, $4; 3d, E. L. Lewis, $3.
Any other variety, twelve specimens:
1st, Elliott & H. W. Moore, $5; 2d, Col. Frederick Mason, $4; 3d, D. R. Craig, $3.

Pumpkin.— Sugar or Winter Luxury, four specimens:
1st, Col. Frederick Mason, $5.

Radish.— White Stuttgart or other winter variety, twelve specimens:
1st, Oliver Ames, $3; 2d, J. A. Nixon, $2; 3d, Oliver Ames, $1.

Salsify.— Twelve specimens:
1st, W. J. Clemson, $3; 2d, A. W. Preston, $2; 3d, Mrs. H. R. Johnstone, $1.

SQUASH.— Bay State, three specimens:
1st, Col. Frederick Mason, $3.
Delicious, three specimens:
1st, H. G. Spring, $3; 2d, Col. Frederick Mason, $2.
Hubbard or any of its varieties, three specimens:
1st, T. Valentine, $3; 2d, Michael Byrne, $2.
Any other winter variety, three specimens:
1st, D. L. Fiske, $3; 2d, Mrs. A. A. Warburton, $2.

TOMATOES.— Any forcing variety grown under glass, twelve specimens:
1st, A. W. Preston, $4; 2d, Mrs. Frederick Ayer, $3.
Any outdoor scarlet variety, twelve specimens:
1st, Col. Frederick Mason, $3; 2d, Col. Frederick Mason, $2; 3d, Mrs. Lester Leland, $1.

TURNIPS.— Any early white flat or purple top white flat variety, twelve specimens:
1st, Oliver Ames, $3; 2d, Elliott & H. W. Moore, $2; 3d, Mrs. J. L. Gardner, $1.
Any globe variety, twelve specimens:
1st, Elliott & H. W. Moore, $3; 2d, Oliver Ames, $2; 3d, Col. Frederick Mason, $1.
Rutabaga, any variety, six specimens:
1st, Col. Frederick Mason, $4; 2d, H. G. Spring, $3; 3d, E. L. Lewis, $2.

HERBS.— Green, fresh, largest and best collection, tastefully arranged, with cards explaining the general use or uses of each variety:
1st, Mrs. A. A. Warburton, $5.

SALAD PLANTS.— Best collection:
1st, Mrs. A. A. Warburton, $6.

Society's Prizes.

For the best new vegetable shown in the year 1913:
N. F. Comley, Tomato Terrace Hall, a Silver Medal
For the best improved vegetable exhibited in the year 1913:
Elliott & H. W. Moore, Potato Drought Proof.

Gratuities:—

William Whitman,	collection of	vegetables,		$8.
G. W. Page,	"	"	"	$3.
Mrs. N. P. Cutler,	"	"	"	$1.

Chrysanthemum Show.

October 30, 31, November 1 and 2.

Collection of Vegetables.— Not less than ten varieties, not more than one variety of a kind, tastefully arranged:

1st, Col. Frederick Mason, $12; 2d, F. W. Sargent, $10; 3d, Mrs. A. A. Warburton, $8.

Gratuities:—

Mrs. A. A. Warburton, collection of Herbs, $2.
" " " " Celery, $1.
Col. Frederick Mason, collection of Endive, $2.
A. W. Preston, collection of vegetables, $4.
N. F. Comley, new Cucumber, White Spine × Telegraph, Honorable Mention.

REPORT OF THE COMMITTEE ON GARDENS FOR THE YEAR 1913.

By the Secretary.

The Committee on Gardens has had this year a season of more than usual activity. Fourteen visits have been made to notable estates and public grounds in New England and suitable awards made in recognition of what is being done in this section of the country for the advancement of the interest in horticulture.

The work of the committee has assumed a somewhat wider scope this year than has been customary in recent years, as the following report will show.

It is believed that in calling public attention to such efforts as are being made by cities and towns to preserve special features in their landscape, and to the railways for decorative plantings around their stations, encouragement will be given for still further accomplishment along these lines.

The Boston Parks.

On June 13, by invitation of Mr. James B. Shea, Superintendent of the Boston Park Department, the committee had the pleasure of making a tour of the various parks and public reservations within the limits of the City of Boston.

Beginning at the Public Garden on Arlington Street the course led through Commonwealth Avenue and the Back Bay Fens, through the several connecting parks interspersed all along the route, and bringing up at Franklin Park in the old Roxbury District.

Throughout this trip the working of a master hand was manifest in the general arrangement and system of planting, so varied in detail, yet so harmonious and natural as a whole.

Along the banks of the Riverway were extensive colonies of the yellow *Iris pseudacorus*, forming brilliant masses of color in the

June sunshine, and tall plants of the native grass, *Phragmites communis*, made a dense jungle growth in the shallow margins of the river.

A little further along brilliant groups of azaleas greeted the eye and thickets of *Rosa multiflora*, in pure white, made an agreeable contrast, while graceful clumps of *Lonicera Morrowii* seemed to be perfectly at home in its surroundings.

In Olmsted Park a magnificent bank of rhododendrons was worthy a long journey for the eye to feast upon. Then the way led around Jamaica Pond, passing the old Parkman grounds and recalling to mind the horticultural work of its former proprietor, the President of the Society forty years ago.

An interesting feature, extending along the Arborway to Forest Hills a distance of two miles, was the long line of red oaks on either side of the roadway. These oaks were planted eight years ago, under the direction of the former Superintendent of Parks, the late Mr. John A. Pettigrew. They are in a flourishing condition and may well serve as a memorial to Mr. Pettigrew's skill and ability in park development and landscape work.

From Forest Hills the way led to Franklin Park with its outcroppings of comglomerate rocks and groups of great native pines, the remnants of the original forest growth. In the open ground was a border of herbaceous plants, 1350 feet in length, just coming into flower, which will form at length an attractive feature here.

At intervals through the groups of trees the range of Blue Hills in the distance made a pleasing and noble picture.

The new City "Zoo" with its bears' dens and the aviaries was not neglected by the committee and a little time was passed in the examination of this popular feature of Franklin Park.

The Arnold Arboretum.

On June 13, the committee also had the opportunity of visiting the Arnold Arboretum, under the guidance of that veteran in horticulture Mr. Jackson Dawson. Banks of gorgeous rhododendrons and azaleas were the most conspicuous features, and rows of *Philadelphus* in many species and varieties were just expanding their clusters of pure white flowers. The mountain laurel also was

becoming conspicuous in its pink inflorescence and at the base of Hemlock Hill was a large collection of native ferns which made an attractive ground covering.

Perhaps the grandest and most noble feature in the Arboretum is the collection of coniferous trees, many of them of large stature, and in their evergreen foliage, beautiful in form and impressive in their grandeur.

The tour of the day was brought to a close with the inspection of the seedling beds around the home of Mr. Dawson. Here were to be found many of the recently introduced plants from western China collected by Mr. E. H. Wilson, and mostly propagated from seed by the skilful hand of Mr. Dawson.

Wilton Lockwood's Gardens at Orleans.

On June 16, the committee again had the pleasure of visiting the peony and rose gardens of Wilton Lockwood at South Orleans, Cape Cod. The favorable impressions of this noteworthy collection formed on the previous visits were fully sustained and the peonies, roses, and other flowering plants testified to the skill of Mr. Lockwood as an expert flower grower. He is still interested in the cultivation of several varieties of yellow peonies, but as yet the results are not wholly satisfactory to him. The Carmine Pillar rose as grown here is without doubt the finest display of this variety that the committee has ever seen in New England.

The two greatest obstacles to success in ornamental gardening in this region are the strong winds that almost continually blow across the Cape and the general lack of sufficient moisture in the soil. These have been in great measure overcome by Mr. Lockwood through his method of protection by surrounding his garden with a double row of trellises, upon which grows a thick covering of vines, and by his system of irrigation which furnishes a plentiful supply of water. The increasing popularity of Cape Cod as a desirable place for a summer home and the numerous attractive estates now being built there make necessary further information and experience as to those species of plants which will thrive best under the conditions there existing, and Mr. Lockwood, through his work at Orleans, is contributing largely to this end.

Visit to Laurel Hill, Ashby.

On June 18, several members of the committee visited Laurel Hill in the town of Ashby to inspect the wonderful natural growth of the mountain laurel, (*Kalmia latifolia*) then in the perfection of bloom.

There are about ten acres of this plant on the hill, forming at this season of the year a natural flower garden of almost indescribable beauty.

The Town of Ashby has acquired the tract on which the laurel grows and will preserve and protect it in the future, and is to be highly commended for what it has done for the preservation of this attractive feature in its landscape.

The committee was so much impressed by this wonderful display that it has voted the Society's Gold Medal in recognition of the town's interest in the work, and also as an incentive to other towns to carry out similar work in preserving features of natural scenery within their borders.

William Sim's Establishment at Cliftondale.

On June 20, the committee was invited to inspect the commercial plant of William Sim at Cliftondale. There are some half-dozen large glass houses and about twenty acres of land outside devoted to the cultivation of sweet peas, pansies, violets, gladioli, strawberries, tomatoes, and sweet corn.

Mr. Sim has attained a wide reputation for the high quality of his products, and he has developed here an extensive and up-to-date establishment for the promotion of intensive flower and vegetable culture.

Just across the road from the farm is the home of Mr. Sim, the grounds handsomely planted with many varieties of shrubs and trees, with evergreens prevailing, and a high ledge in the rear affords from its summit a grand view of sea and landscape.

W. Prentiss Parker's Estate at Roxbury.

On July 2, the committee visited the suburban residence of W. Prentiss Parker in Roxbury. Here is a fine old estate that has seen no change of family ownership since 1672. The house sets back from the street and the surrounding grounds are occupied with grand old trees and borders of flowers and vines.

In the rear of the estate is a notable vegetable garden, so cleanly kept and in such fine condition as to call forth the commendation of the visitors and to call up the gardener, Thomas Killion, for a word of praise for his careful work and skilful cultivation of the estate, on which he has been employed for thirty years.

Mrs. R. D. Evan's Estate at Beverly.

July 8, the committee inspected the notable estate of Mrs. Robert D. Evans at Beverly situated on one of those rocky headlands on the north shore of Massachusetts Bay. In addition to the usual plantations of trees, shrubs, flowers, and vegetables interspersed through the extensive grounds, a feature of especial interest and the principal object of the visit was the Italian garden recently constructed by the Messrs. Farquhar.

It is probably the finest example of this class of garden to be found in the state and will make the Evans place a most noteworthy one in the annals of modern horticulture. With its statuary, stone basins, and tiled plazas, in the midst of which gaily colored flowers revel in the sunshine, it presented an interesting picture and brought to mind, in its general plan at least, the famous gardens of a generation long since passed away. It is certainly a noteworthy undertaking and Mrs. Evans' interest and liberality in constructing such a garden should receive the highest appreciation. The gardener of the estate, James George, should receive credit for the ability shown in the care and improvement of the grounds.

R. & J. Farquhar's Nurseries at Roslindale and Dedham.

On July 11, the committee was privileged to inspect the extensive nurseries and greenhouses of R. & J. Farquhar & Co. at Roslindale and Dedham.

The principal object of the visit was to see the field of the new *Lilium myriophyllum* which had been propagated by the Messrs. Farquhar from bulbs collected by Mr. E. H. Wilson in western China.

The plantation, now in its third year, presented a magnificent spectacle, with its thousands of fully developed flowers growing thickly on their slender stems. As many as twenty large lilies have grown on a single plant but three feet high, though the average bloom is from five to seven.

The lily is perfectly hardy and promises to be a valuable acquisition to the list of florists' flowers and is well adapted for general cultivation.

Near by was another plantation of the new Chinese lily, *Lilium Sargentiae*, also one of Wilson's introductions. It flowers about two weeks later than *L. myriophyllum* and will probably prove fully as valuable an acquisition. Mr. Jackson Dawson, a member of the committee, writes the Secretary regarding these lilies as follows:

"I must say that the *Lilium Sargentiae* is one of the finest things I have seen in the way of a lily. It is well worthy of all that you can say about it.

The taking of the three lilies together, myriophyllum, Sargentiae, and Henryi, fills in a great season among the lilies, and I think that with the addition of *Lilium lancifolium* and its varieties gives us a season of blooming from spring to fall.

I think we cannot give too much praise to the addition of Mr. Wilson's three lilies which have formed this beautiful blooming of lilies from spring to fall."

Later in the afternoon the party visited the new establishment of the Messrs. Farquhar at Dedham to examine their recently constructed greenhouses and to survey the grounds planted with an almost innumerable variety of herbaceous and shrubby stock.

The great advance in commercial horticulture in recent years is well illustrated in this establishment, about one hundred and fifty acres being required to supply the demands of the trade.

David R. Craig's Estate at Wellesley.

July 22, on invitation of David R. Craig, the committee had the great pleasure of visiting his estate, Craigard, at Wellesley. Situ-

ated upon elevated ground it commands an extensive view of the surrounding landscape from the Blue Hills of Milton to Mount Wachusett on the west.

There are some twenty-five acres included in the estate mostly devoted to ornamental tree planting, especially evergreens. There are also vegetable and small fruit gardens, a goodly sized orchard of a hundred trees, greenhouse for fruit and flower growing, and a large area of forest growth of oak, pine, and chestnut.

Mr. Craig has also an acre or so of alfalfa as an experiment which promises successful results, and his ability as a farmer is shown from the fact that last year on three-fourths of an acre he harvested 270 bushels of potatoes of the highest quality.

The members of the committee were greatly pleased with the estate of Mr. Craig, combining as he does the ornamental and the practical in rural life.

Visit to Mount Desert Island, Maine.

August 3, the committee, on invitation of Mr. George B. Dorr of Boston and Bar Harbor, visited the extensive plant of the Mount Desert Nurseries as well as several other notable estates in Bar Harbor, Maine.

Mr. Dorr has a wonderful collection, acres in extent, of hardy herbaceous flowering plants, as well as of trees and shrubs, and the masses of brilliant flowers form a striking contrast as one looks up to the background of the rugged mountain sides close at hand.

The climate of Mount Desert Island is very favorable to the growth of flowering plants by reason of the absence of the long period of heat and drouth generally encountered in more southern sections of New England and many species thrive there that cannot be so successfully grown in eastern Massachusetts.

The colors of the flowers also, as is usual in gardens near the sea, are deeper and more brilliant and never had the committee seen finer phloxes, spiraeas, incarvilleas, aconitums, sweet peas, and penstemons than Mr. Dorr grows there.

The next place visited was the estate of Mrs. John S. Kennedy of which William T. Burton is the superintendent. This place of some twenty-five acres, almost entirely under ornamental cultiva-

tion, occupies a rocky point with the sea on the one hand and a view of the naked, scarred summit of Newport Mountain on the other.

There were acres of velvety lawns interspersed with a great variety of trees and shrubs, many of which were the original occupants of the grounds. The most interesting feature of the estate was an elaborate Italian garden with its accessories of statuary, fountains, and masses of flowers.

Another estate visited was that of Henry Lane Eno with its beautiful mansion commanding a most attractive view across the wide expanse of Frenchman's Bay to the range of Gouldsboro mountains in the distance. Here was noted a fine example of fruit culture, grown *en espalier* against a high stone wall and thickly studded with handsome looking peaches and other fruits.

The next headland to the east of Mr. Eno's was occupied by the picturesque estate of Dr. Robert Abbe, mostly preserving the original wildness of nature, but having as a special feature an interesting Japanese garden guarded by the effigy of a Japanese deity, whose dignified and solemn countenance evoked from the visitors more or less respectful salaams.

The last estate which time allowed for a brief inspection was that of George S. Bowdoin which also commanded a broad outlook over Frenchman's Bay. Here was especially noted a fine collection of flowering plants in the perfection of bloom.

Many other estates, doubtless of equal interest and beauty, could have been seen if time permitted, but the few herewith mentioned will serve as illustrative of the horticultural interest that exists among the summer residents of Mount Desert Island.

B. Hammond Tracy's Gladiolus Farm at Wenham.

On August 11, the committee visited the gladiolus farm of B. Hammond Tracy at Wenham. Many improvements and a considerable extension of the plantings have been made since the visit of the committee a year ago. There are now 26 acres under cultivation devoted exclusively to the gladiolus and notwithstanding the unusually dry season the plants were in excellent condition showing the result of intelligent culture and knowledge of the requirements of this flower.

Large tracts were devoted to the propagation of two varieties,

the Dawn and America, which appear to be the popular kinds and colors.

The gladiolus is becoming every year more popular and its use in the florists' trade is continually on the increase.

Oliver Ames' Vegetable Garden at North Easton.

On August 13, the committee again had the pleasure of visiting the estate of Oliver Ames at North Easton with the special object of inspecting the vegetable garden thereon.

There are about two acres enclosed by a substantial stone wall and almost every known kind of culinary vegetable can be found under cultivation here. It was indeed an ideal vegetable garden and one that the committee is proud to call attention to as a model of its kind. The flower plantings around the borders and along the paths through the garden show a pleasing combination of horticulture and vegetable culture worthy of commendation and go to show that a vegetable garden can be made an ornamental feature of an estate.

The cleanliness of the grounds and the fine condition of the various crops reflect credit upon the skill and knowledge of Edward Parker, the Superintendent of the estate.

A. A. Marshall's Apple Orchard at Fitchburg.

September 9, the committee visited the notable apple orchard of A. A. Marshall at Fitchburg. The location is on the top and sides of a hill some 600 feet above sea level and contains 6500 trees, the oldest of which are but ten years from planting and are now bearing heavily.

Mr. Marshall is also opening up new tracts for more planting and the process of converting a piece of stony woodland into what will be eventually a smoothly finished apple orchard was noted with much interest. There was also a block of some 400 trees planted the present year which show a very encouraging growth for one season.

The varieties planted are mostly McIntosh, Wealthy, Baldwin, Sutton Beauty, and Gravenstein, and the new plantings are confined almost entirely to the McIntosh which seems to do especially well here, trees ten years old bearing 25 bushels of apples.

A feature of the orchard is the high percentage of large and perfect fruit, no "cider" apples being grown. This is the result of thinning during the summer. The system of cultivation adopted is the so-called sod plan, the orchard being seeded to grass which is mowed twice during the season and left upon the ground as a mulch.

A circle of about six feet in diameter is left around each tree, more as a protection against grass fires than for other benefit, and an annual dressing of sulphate of potash and ground bone is applied. The orchard is sprayed six times a year and the trees are not allowed to attain a height exceeding twenty feet.

The committee also inspected with much interest the packing house with its grading machine and the cold storage plant, with its electric machinery, all giving evidence of the careful and intelligent attention devoted to the business. It impresses one as a great manufacturing plant for the production of apples.

Hillcrest Farm at Weston.

On September 30, the last visit of the season was made to Hillcrest Farm, the estate of Miss Marian Roby Case at Weston. Miss Case has seventy acres of desirable land beautifully diversified with forest growth, meadows, and open hillsides, commanding a wide view of the surrounding landscape. There are also large tracts devoted to the cultivation of garden vegetables and fruits in which Miss Case is especially interested, and an auto truck is used to distribute the products of the farm to many families in the vicinity.

She is also much interested in the agricultural education of the young people of the vicinity and carries on a class for boys whom she provides with competent instructors during the season and has built a commodious club-house for their entertainment and instruction.

Awards made by the Committee on Gardens.

1913.

Boston Park Department, for advancement in landscape gardening, Gold Medal

The Arnold Arboretum, for the introduction of new plants, Gold Medal

Town of Ashby, for the preservation of Kalmia latifolia on Laurel Hill, Gold Medal

William Sim, Cliftondale, for advancement in flower and vegetable culture, Gold Medal

Mrs. R. D. Evans, Beverly, for Italian garden at Beverly, Gold Medal

Wilton Lockwood, South Orleans, for collection of climbing roses, Silver Medal

Thomas Killion, Roxbury, for skilful cultivation of estate of W. P. Parker, Silver Medal

James George, Beverly, for skilful cultivation and care of estate of Mrs. R. D. Evans, Beverly, Silver Medal

R. & J. Farquhar & Co., Roslindale and Dedham, Special Certificate of Merit

David R. Craig, Wellesley, for his work in renovating and improving an old estate, Special Certificate of Merit

Mount Desert Nurseries, Bar Harbor, Maine, for superior cultivation of garden plants, Special Certificate of Merit

B. Hammond Tracy, Wenham, for continued advancement in gladiolus culture, Silver Medal

A. A. Marshall, Fitchburg, for apple orchard, Silver Medal

Oliver Ames, North Easton, for skilful cultivation of vegetable garden, Silver Medal

Miss Marian R. Case, Weston, for farm and estate, Honorable Mention

JOHN K. M. L. FARQUHAR, *Chairman*
DAVID R. CRAIG
JACKSON T. DAWSON
ARTHUR H. FEWKES
THOMAS J. GREY
T. D. HATFIELD
RICHARD HITTINGER
DR. HARRIS KENNEDY
WILLIAM NICHOLSON
DAVID F. ROY
CHARLES SANDER
WILFRID WHEELER

Committee on Gardens.

REPORT OF THE COMMITTEE ON CHILDREN'S GARDENS.

By Henry Saxton Adams, Chairman.

Your committee is pleased to report another successful year. Prizes were offered at two exhibitions during the year, namely, at the regular Children's Garden Exhibition, August 30th and 31st, and at the Sweet Pea Show in July.

The exhibits at the Sweet Pea Show were comparatively few in number, so we have decided not to continue prizes for sweet peas another year. We had no entries of sweet peas from school gardens and only five from children's home gardens. The flowers exhibited were good and the experiment was well worth trying.

The regular exhibition of products of children's gardens was a marked improvement over any previous year particularly in the number of exhibitors. The attendance Saturday and Sunday afternoons was good, showing the general interest which the public now has in children's gardens. The exhibits themselves were unusually good and the long list of prizes awarded shows the gain which was made.

In 1912 we awarded at this exhibition 108 prizes. This year we awarded 168 prizes and we believe there is no work carried on by the Society which gives better promise for future results. The school and home gardens are increasing throughout the state and almost every community of any size carries on this work for the children during the summer. We appreciate the encouragement which has been given by various members of the Society and particularly by the Board of Trustees. Our schedule of prizes for next year is even better than for 1913 and we look forward to a still greater interest in the exhibition.

While prizes are awarded by local societies at their exhibitions a child winning a prize given by our society feels he has won something more than the local prize and receives a greater stimulus for

better effort next year. We are glad to do our part to encourage the little ones and it seems well worth while.

The list of prizes awarded follows and will repay a careful examination.

HENRY SAXTON ADAMS
HARRY S. RAND
MISS MARGARET A. RAND
WILLIAM P. RICH
B. HAMMOND TRACY
JAMES WHEELER

Committee on Children's Gardens.

PRIZES AND GRATUITIES AWARDED DURING THE YEAR 1913 BY THE COMMITTEE ON CHILDREN'S GARDENS.

JULY 12, 13.

For the best collection of sweet peas from a child's home garden:

First.— Edgar Parker, North Easton	$5 00
Second.— Gertrude Schulz, Roslindale	4 00
Third.— Evelyn Fisher, Waltham	3 00
Fourth.— Willo F. Blossom, Cliftondale	2 00
Fifth.— Pearl Loving, South Natick	1 00

Special Award.

Gertrude Schulz, Roslindale, for two vases of flowers from a home garden	1 00

AUGUST 30, 31.

For the best collection of vegetables from a school garden:

First.— South End Industrial School, Roxbury	6 00
Second.— Waltham Home Garden Association	5 00
Third.— South Lancaster School Garden	4 00

For the best collection of vegetables from a school garden established since 1909:

First.— The Rural School Gardens, West Groton	5 00
Second.— Boy Scout Gardens	4 00

For the best collection of flowers from a school garden:

First.— South End Industrial School, Roxbury $6 00

For the best collection of flowers from a school garden established since 1909:

First.— Sterling St. Garden 5 00
Second.— Boy Scout Garden 4 00
Third.— Groton School Garden 3 00
Fourth.— Neighborhood House Garden, Cambridge 2 00

For the best collection of vegetables from a child's home garden:

First.— Robert Fisher, Waltham 5 00
Second.— Hermine Schulz, Roslindale 4 00
Third.— Donald W. Rust, Jamaica Plain 3 00
Fourth.— Paul Peak, South Natick 2 00
Fifth.— Joseph Barber, Wollaston 1 00

For the best collection of flowers from a child's home garden:

First.— John Thatcher, Brookline 5 00
Second.— Evelyn Fisher, Waltham 4 00
Third.— Edith McPherson, Roxbury 3 00
Fourth.— Gertrude Schulz, Roslindale 2 00
Fifth.— Richard Fredey, Newton 1 00

For the best vase of flowers from a child's garden, arranged with any foliage:

First.— Willo F. Blossom, Cliftondale 3 00
Second.— Harry Nugar 2 50
Third.— Lillian Colman 2 00
Fourth.— Royal Sucaso, Boston 1 50
Fifth.— Mildred Nason, Boston 1 00

For the best potted plant grown by a child in the City of Boston:

First.— Helen Nagel 3 00
Second.— Etta and Annie Goldberg 2 00
Third.— Richard Walsh 1 00

For the best bouquet of flowers from a child's home garden:

First.— Irene Lincoln, Marlboro 3 00
Second.— Edith McPherson, Roxbury 2 50
Third.— Gertrude Schulz, Roslindale 2 00
Fourth.— May Snyder, Boston 1 50
Fifth.— Willo F. Blossom, Cliftondale 1 00

For the best collection of native flowers, berries, leaves, etc.:

First.— Olive E. Colburn, Waltham	$5 00
Second.— Margaret Horgan, Quincy	4 00
Third.— Evelyn Fisher, Waltham	3 00

For the best three vases of china asters:

First.— Melvin Tozzy, Brockton	3 00
Second.— Belle McCaull, Roxbury	2 00
Third.— Perkins School, Brockton	1 00

For the best three vases of dahlias:

First.— Miriam O'Neil, Roxbury	3 00
Second.— Ralph Hatch, Brockton	2 00
Third.— Irene B. Lincoln	1 00

For the best three vases of gladioli:

First.— Irene B. Lincoln	3 00
Second.— John Thatcher, Brookline	2 00
Third.— Eunice Dean, Marlboro	1 00

For the best six specimens of beets:

First.— Edward Hoffman, Roxbury	3 00
Second.— Martha Kreidel, Roxbury	2 00
Third.— James Mellen, Brockton	1 00

For the best six ears of green sweet corn:

First.— Hermine Schluz, Roslindale	3 00
Second.— Lyon Brothers, Brockton	2 00
Third.— Collins Dresser, Wollaston	1 00

For the best four specimens of cucumbers:

First.— Hermine Schulz, Roslindale	3 00
Second.— Charles Peterson, Roxbury	2 00
Third.— Marjorie Lord, Jamaica Plain	1 00

For the best plate green string beans:

First.— Arthur C. Rust, Jamaica Plain	3 00
Second.— Donald W. Rust, Jamaica Plain	2 00
Third.— Margaret Thatcher, Brookline	1 00

For the largest pumpkin or squash:

First.— Theodore Smith, Quincy	$3 00
Second.— Donald W. Rust, Jamaica Plain	2 00
Third.— Philip Young, Quincy	1 00

For the best plate of carrots, six specimens:

First.— George Walcott, Concord	3 00
Second.— Robert Park, Wollaston	2 00
Third.— Joseph Luz, Marlboro	1 00

For the best plate of tomatoes, six specimens:

First.— Nicholas Spadea, Brockton	3 00
Second.— John Capenas, Brockton	2 00
Third.— John Corbett, Brockton	1 00

For any other variety of vegetable not mentioned in this list:

First.— James Lyon, Brockton, potatoes	3 00
Second.— Alvin Lincoln, Marlboro, watermelon	2 00
Third.— Donald and Robert Bixby, West Groton, onions	1 00

For the best collection of four different vegetables:

First.— George Wolcott, Concord	5 00
Second.— Donald W. Rust, Jamaica Plain	3 00
Third.— Katherine Sullivan, Roxbury	2 00

Special Awards.

VEGETABLES.

Pearl Loving, South Natick	1 00
Lawrence H. Lewis, Groton	1 00
Mildred Oberlander, Roslindale	50
James Zavattoni, Quincy	50
Henry Nilson, Quincy	50
Nora Mahoney, Quincy	50
Neil Doherty, Jamaica Plain	50
Quincy Children's Garden	3 00
Bernard Pohl, Roslindale	50
Hampshire St. Vacant Lot Garden	2 00
Sterling St. Garden, cart of vegetables	2 00
Harry Muger, beets	50
James Lyon, Brockton	50

Arthur C. Rust, Jamaica Plain, corn	$ 50
Oscar Howe, Marlboro, corn	50
John Boltz, corn	50
Bertha Norton, Roxbury, corn	50
Lillian Kleinberg, Jamaica Plain, corn	50
Peter Szymkencixcy, Brockton, corn	50
Thomas McGrath, corn	50
Flora and Frances Levin, Jamaica Plain, cucumbers	50
Phyllis Rankin, beans	50
Helen Carr, cucumbers	50
John Boltz, cucumbers	50
Hermine Schulz, Roslindale, squash	50
Lyon Brothers, Brockton, squash	50
James Lyon, Brockton, carrots	50
Donald Packard, Brockton, carrots	50
Willo F. Blossom, Cliftondale, carrots	50
James Lyon, Brockton, tomatoes	50
Helen Gavin, Roxbury, tomatoes	50
Peter Szymkencixcy, Brockton, tomatoes	50
Donald W. Rust, Jamaica Plain, tomatoes	50
Arthur Favor, Brockton, tomatoes	50
Albert O'Connell, Brockton, tomatoes	50
Wilson Walker, Marlboro, tomatoes	50
Ethel Slater, Roxbury, tomatoes	50
Nicholas Spadea, Brockton	1 00
Peter Szymkencixcy, Brockton	50
Peter Szymkencixcy, Brockton	50
Lyon Brothers, Brockton	50
Wallace McGuiniss, Brockton	50
Peter Szymkencixcy, Brockton	50
George Wolcott, Concord	50
Irving Kegar, West Groton	50
Phyllis Rankin	50
Joseph Barber, Wollaston	50
Mary Bradley, Quincy	50
Clarke Wilson, Roxbury	50
Joe Scanlon, Roxbury	1 00
Helen Martin, Roxbury	50
Una Whittaker, Roxbury	50
Mary O'Connor, Roxbury	50
Ida Cameron, Roxbury	50
Vincent Madeno, Roxbury	50
Walter Poblenz, Roxbury, pumpkin	50
Rosalind Racz, Jamaica Plain, peppers	50
John Langon, Jamaica Plain, muskmelons	50
Carolyn A. Lee, Roslindale, stack of corn	50
Hermine Schulz, Roslindale, Honorable Mention	

Special Awards.

Flowers.

Freda and Mildred Hauser, Roxbury	$3 00
South Bay Union, Roof garden	2 00
Irene B. Lincoln	1 00
Winslow Stratton, Marlboro	1 00
Quincy Children's Garden	2 00
Arthur Nagle	50
Mary O'Connor, Roxbury	50
Ida E. Cameron, Boston	50
Helen Nason, Boston	50
Martha Kreidel, Roxbury	50
Martha Dahl, Roxbury	50
Grace Lynch, Roxbury	50
Joseph Doherty, Roxbury	50
Lucy Shay, Wollaston	50
Florence Swanson, Wollaston	50
John Pompeo, Quincy	50
John Wentworth, Quincy	50
Dorothy and Beatrice Clark, Quincy	50
Alice Daly, Roxbury, bouquet	50
Ethel Newcomb, Quincy, bouquet	50
Ethel Lund, bouquet	50
Lillian Kleinberg, Jamaica Plain	50
Thomas O'Connor, Roxbury	50
Frank Hartbecker, Roxbury, roof garden	50
Zelda Hirsch, Boston, roof garden	50
Etta Goldberg, Boston, roof garden	25
Madeline Parsons, Quincy, gladioli	50
Alice Duggan, Roxbury, asters	50
Marjorie Buch, Brockton	50
Mildred Keys, asters	50
Eunice Dean, Marlboro, dahlias	50
Aline Galenas, Marlboro, dahlias	50
Mary Lus, Marlboro, dahlias	50
Helen Finn, Marlboro, dahlias	50
Henry Kreidel, Roxbury, dahlias	50
Walter Poblenz, Roxbury, dahlias	50

REPORT OF THE COMMITTEE ON LECTURES AND PUBLICATIONS FOR THE YEAR 1913.

By Wilfrid Wheeler, Chairman.

The program offered before the Society during the year 1913 was a well-balanced one, embracing subjects suitable to our varied interests, although the fruit question was discussed in three different lectures, and probably brought out the largest attendance. It would seem necessary to your committee, however, that some change in the general lecture program should be made, inasmuch as there has been a tendency towards a decrease in the attendance at lectures other than those on fruit subjects.

A special committee of the Trustees, of which your chairman was a member, believes that some other form of meeting should gradually take the place of our lecture course, but not entirely so. To this end it would seem well to substitute demonstrations, both indoor and outdoor, on practical horticultural subjects, as well as field days to visit places of horticultural interest, where practical persons would explain to the people attending, the points of interest in the place visited. This would be of especial value to students, gardeners, and those studying for landscape architects, inasmuch as such places as the Arboretum and many of our larger nurseries could be visited, and the plants and trees, etc., studied, not only with a view to artistic planting, but also for the purpose of obtaining a first-hand knowledge of how they are grown.

Orchards and farms growing special crops could also be visited by persons wishing to take advantage of the course, and in this way a practical knowledge obtained as to how things are conducted on such places.

Indoor demonstrations should take up instruction in planting seeds, grafting, pruning, and the propagation of plants.

We wish to offer at this time one suggestion which we feel sure would add materially, not only to the attendance of our lectures,

but also to the attendance at our exhibitions, and that is that the Society should adopt some attractive poster which could be printed to suit the different occasions for which it is to be used, but would be distinct enough to call the attention of the public to the fact that there is something going on at Horticultural Hall in this city. We think that we suffer in lack of attendance from the fact that our meetings and exhibitions are not sufficiently advertised in the city to bring them distinctly to the attention of the people. Newspaper advertising and posters on the building are well enough in their way, but do not get at the large masses of people that a large number of small posters would. We are offering this as a suggestion which we think well worth the consideration of the Society.

During the course for the year 1914, the committee has made one decided change from the routine of the old program by introducing the so-called school for fruit growing, conducted by the Extension Department of the Agricultural College. This school will take up all phases of fruit growing, and will hold sessions practically the entire week. It is hoped that this will be well attended, not only by our practical growers, but also by those interested in the fruit problem.

The question spoken of in last year's report by Mr. Wilder, regarding a lecture hall, is becoming more and more important, as it would seem, under the present arrangement, that the lectures are likely to be interrupted by the renting of the hall, or for various other causes. If there were a suitable hall in some other part of the building, the lecture course could go on without any interruption, and other work could also be done in connection with this committee.

The following programme of lectures and discussions for the year 1914, is submitted:—

January 3. Utilizing Birds in Horticulture. Illustrated. By Edward H. Forbush, Boston.

January 10. Flower Groupings in a Michigan Garden. Illustrated. By Mrs. Francis King, Alma, Mich.

January 17. The Hybrid Tea Rose of Today. By George H. Peterson, Fair Lawn, N. J.

January 31. Soils and Fertilizers. By Dr. H. J. Wheeler, Boston.

February 7. Agriculture in Holland and Denmark. Illustrated. By Hon. J. Lewis Ellsworth, Worcester.

February 14. Making a New Variety of Asparagus. By J. B. Norton, Washington, D. C.

February 24–28. Extension School in Pomology, conducted by the Mass. Agricultural College under the auspices of the Mass. Horticultural Society. Lectures as follow:

Tuesday, February 24.

9.30 A. M. Varieties of Fruits. Dr. J. K. Shaw.

10.45 A. M. Orchard Sites. Prof. F. C. Sears.

1.00 P. M. Fertilizers for the Orchard. Mr. Henri Haskins.

Wednesday, February 25.

9.30 A. M. Establishing the Orchard. Mr. R. W. Rees.

10.45 A. M. Factors Influencing the Quality of Fruits. Dr. Shaw.

1.00 P. M. Orchard Pests. Prof. W. W. Chenoweth.

2.15 P. M. The Spraying Campaign. Mr. Rees.

Thursday, February 26.

9.30 A. M. Soil Management in the Orchard. Mr. Rees.

10.45 A. M. General Principles of Pruning. Prof. Chenoweth.

1.00 P. M. Demonstration of Pruning. Mr. Rees and Prof. Sears.

Friday, February 27.

9.30 A. M. Grafting and Budding. Prof. Chenoweth.

10.45 A. M. Picking and Handling Fruit. Prof. Sears.

1.00. P. M. Packing Apples in Boxes. Mr. Rees.

2.15 P. M. Packing Apples in Barrels. Prof. Sears.

Saturday, February 28.

9.30 A. M. Can we sell our Apples? Prof. F. A. Waugh.

10.45 A. M. Pear Growing. Hon. Wilfrid Wheeler.
1.00 P. M. Coöperation Among Fruit Growers. Dr. A. E. Cance.
2.15. P. M. Peach Growing. Prof. Waugh.

March 7. Nut Culture. By Prof. E. R. Lake, Washington, D. C.

March 21. Undesirable Foreign Plant Diseases. By Dr. Perley Spaulding, Washington, D. C. *The John Lewis Russell Lecture.*

WILFRID WHEELER
GEORGE B. DORR
F. C. SEARS
} *Committee on Lectures.*

REPORT OF THE DELEGATE TO THE STATE BOARD OF AGRICULTURE FOR THE YEAR 1913.

By Wilfrid Wheeler, Delegate.

Considering the State as a whole, the season of 1913 was a fairly successful one for our farmers, although the extremely dry weather of the midsummer had a tendency to shorten many crops. For this reason prices ruled fairly high, and farmers were on the whole pretty well satisfied.

The market-garden crops, during the winter, particularly the lettuce crop, were not very satisfactory, but most of our market gardeners made up for the poor crops of the winter by abundant crops during the early spring and summer, and as most of the market gardens are well irrigated, the dry summer did not affect them as much as it did the general farmers.

It is to be regretted that dairying in the State is apparently on the wane, and several reasons are advanced for this, chief among which is that the price paid to the farmers for milk is very unsatisfactory, and practically none of them can produce milk at the general price paid. The continued agitation before the Legislature of the milk question has discouraged many farmers who find that they can raise other crops to better advantage and with less trouble than is experienced in dairying.

The fruit crop was severely cut by frosts the latter part of May, so that on the whole Massachusetts produced only about one-half the usual crop.

The work of the Board, during this past season, has been along the usual lines, but much additional work is contemplated in the near future, provided that the Legislature will furnish the necessary funds.

Institutes have been held numbering 138, and the attendance has been exceedingly good.

Probably one of the most important pieces of work the Board has undertaken in recent years is that of encouraging dairying

by a special appropriation of $15,000, $5,000 being available an nually for three years. This work has been in charge of the Dairy Bureau and has taken the form of awarding prizes to farmers for the best clean milk. This contest brought out 151 contestants, and was conducted by dividing the State into two sections — eastern and western. In the eastern section the contestants exhibited at the Brockton Fair, while in the western section the exhibit was held in connection with the Winter Meeting of the State Board of Agriculture at Springfield. This contest was the first ever held in this State, where the sediment test was applied to milk. A sample of the unstrained milk of five cows was taken in the presence of the Inspector and strained through cotton. These cottons were preserved as a record, and judged by an expert bacteriologist.

The whole contest has proved that the man is the chief factor in making clean milk, for samples taken from the most ordinary barns, where a cleanly man did the milking, as a rule ranked far ahead of those taken from barns where all kinds of dairy appliances were used. It has awakened a keen interest in the production of clean milk, and we hope that if similar contests are held each year, the quality of the milk produced in Massachusetts will be raised materially.

Special exhibitions have been held by the Board this year in connection with the New England Fruit Show, at which the Board offered many prizes for Massachusetts-grown fruit; also the Massachusetts Dairymen's Association was given $500 with which two splendid exhibitions of milk and dairy appliances were held, one at Brockton and the other at Springfield. In connection with the Winter Meeting of the Board a corn show was held, and this brought out a very creditable exhibition, considering that this year corn was very badly injured by early frosts in September. These premiums, amounting to $300, were paid from the special appropriation for prizes.

Publications.

The publications of the Board for the year have been as follow:

A monthly Crop Report with subjects of interest and importance to Massachusetts Farmers, averaging 6,000 copies.

A List of Available Publications, 2,000 copies.

Eleven Nature Leaflets, reprinted.

Bulletin 4 — on Massachusetts Agriculture; second edition, revised.

Circular 1 — third edition, revised, 10,000 copies.

Circular 2 — reprint, supplanting Nature Leaflet 4, 5,000 copies.

Circular 3 — reprint, supplanting Nature Leaflet 42, 1,000 copies.

Circular 5 — from May, 1912 Crop Report, 2,000 copies.

Circular 6 — reprint, supplanting Nature Leaflet 33, 3,000 copies.

Four circulars on Dairying Subjects.

Separate 2 — from the Annual Report for 1912, 1,000 copies.

Separate 3 — from the Annual Report for 1912, 500 copies.

Separate — on small fruits and berries, 500 copies.

Separate — on market gardening, 600 copies.

Separate — on poultry management, 4,000 copies.

Agriculture of Massachusetts, 1912, was also printed, 15,000 copies, 703 pages, and contains the reports of the Secretary, the State Nursery Inspector, the State Ornithologist, the State Apiary Inspector, the State Dairy Bureau, the State Forester, and the Massachusetts Agricultural Experiment Station.

There has also been a revision of Mr. Forbush's book, "Useful Birds and Their Protection," now in its fourth edition, 3,000 copies having been printed. This book contains 451 pages, and is undoubtedly the best of its kind ever published, considering that it has been brought up to date. The demand for this publication is great, and many copies have been disposed of.

Work of the Office.

The work of the office has increased materially during the past year, and at present there is a large volume of correspondence.

Meetings of the Board.

The meetings of the Board were as follow:—

The Summer Field Meeting was held at Barnstable, July 31, 1913, in connection with the meeting of the State Grange, at which

Professor J. C. Graham of the Massachusetts Agricultural College, and Dr. H. J. Franklin of the Cranberry Experiment Station, spoke to an interested audience of Cape Cod people, on poultry and cranberries, respectively, two very important subjects to the Cape inhabitants.

The Public Winter Meeting of the Board was held at Springfield, December 2, 3, and 4, and an interesting program was presented of lectures and discussions on Poultry, Seeds, Milk and Dairying, Apples, Farm Management, Boys' and Girls' Club Work, Home Improvement, Alfalfa, and Rural Credit Banking.

This meeting was undoubtedly one of the best attended and most interesting meetings the Board has ever held. It being a joint meeting of the Hampden County Improvement League, the Massachusetts Dairymen's Association, the Massachusetts Milk Inspectors' Association, and the New England Alfalfa Growers' Association, a more statewide interest was manifested.

Organization.

From time to time bills looking toward the reorganization of the Board are presented to the Legislature by persons who either do not know the situation, or who have some personal or other equally inadequate reasons for desiring such a reorganization. The Board at the present time numbers 43 members, including the Governor, Lieutenant Governor, Secretary of the Commonwealth, and several other State Officers, who are more or less inactive on the Board. It is the opinion of your delegate that the form of organization of the Board is ideal. It is composed of representatives from the most important agricultural societies of the State who come in close touch with the active farmers of the State, and who best know the needs of the farmers, and would seem to be the natural persons to form a Board of Agriculture.

A comparison of the work of this organization with that of the other States, where Commissions or smaller boards are in power, shows that this Board is doing fully as good work with the amount of money available as any other agricultural board or commission.

While members of the Massachusetts Horticultural Society

may from time to time hear of the contemplated abolition of the Board, it would be well for you to further investigate the matter in order to see for yourselves whether or not the charges made have any foundation, or that better results would be obtained under a new organization.

This Board has been accused at various times of standing in the way of legislation which would lead toward the production of clean milk for the cities of our State, but the Board can adequately prove that it has always stood for good legislation which would not only benefit the farmer, but the consumer as well, and has opposed such legislation as would discourage the farmer from producing more and better milk.

REPORT OF THE SECRETARY AND LIBRARIAN FOR THE YEAR 1913.

The work of the Society during the year 1913 has proceeded along the customary lines that the experience of many years has shown to be the most satisfactory agencies for the advancement of the interest in horticulture in this section of the country.

Thirteen exhibitions of plants, flowers, fruits, and vegetables have been held, the details of which will be fully elaborated in the annual reports of the chairmen of the various committees.

It is noteworthy that the general interest in horticultural matters everywhere is increasing and the tendency toward the suburban and rural life with its gardens and orchards is very evident, and it is the main purpose of the Society and the object for which it was founded to encourage this interest by showing its possibilities and by fostering its further development.

It is also noteworthy in this connection that hardy plants and shrubs are receiving more attention than in former years although the splendid displays of greenhouse foliage and flowering plants are still prominent features of our exhibitions.

In addition to the Society's shows a record should be made of meetings and exhibits of kindred organizations during the year.

In January the Massachusetts Fruit Growers' Association held its 19th annual convention in our halls. There was a large attendance of people interested in the subject of fruit growing in New England and the various lectures and discussions were highly interesting and profitable.

In November the New England Fruit Show held its third biennial exhibition in connection with the Society's special fruit show. It illustrated the great advance and improvement made in the quality of New England apples in recent years and it is certain that no such exhibit could have been made even a decade ago.

Other societies have also joined with us in increasing the interest in our exhibitions, notably, the Gladiolus and Dahlia societies in August and September.

A new edition of the Charter and By-laws of the Society has been printed during the year which contains all the recently adopted amendments, also the diploma of membership has been re-engraved by Mr. J. A. J. Wilcox, the old plate having been lost or destroyed many years ago.

The death of 28 life and annual members and 2 corresponding members has been recorded and 30 new members added to the roll of membership.

The publications of the Society and the dates of issue have been as follow:

March 4. Schedule of Prizes and Exhibitions, 1913, 56 pp.

May 3. Transactions, 1912, Part 2, pp. 186–231 and plates 1–6.

July 1. Transactions, 1913, Part I, pp. 1–132 and plates 1–2.

September 23. Preliminary Schedule of Prizes and Exhibitions for the year 1914, 60 pp.

The Library.

Work on the proposed new catalogue of the library has been in progress throughout the year and is now practically completed and ready for printing.

Numerous additions to the collection of horticultural trade catalogues have been made and the collection now numbers nearly 9000 items. It is of much value for historical reference and is frequently consulted by specialists in the preparation of publications on the history of garden plants and vegetables. The oldest catalogues thus far received are those of England dating back to 1776, of France dating from 1789, and the United States from 1793.

Grateful acknowledgement should be made of the continued interest in the library of Messrs. N. T. Kidder and Edward E. Norton. Mr. Kidder presented during the year an autograph letter of the first President of the Society, Gen'l H. A. S. Dearborn, in reference to its first By-laws, and Mr. Norton presented an old plant catalogue published in London in 1790.

William P. Rich,
Secretary and Librarian.

REPORT OF THE TREASURER FOR THE YEAR 1913.

MASSACHUSETTS HORTICULTURAL SOCIETY *in account current with* WALTER HUNNEWELL, *Treasurer, December 31, 1913.*

DR.

Paid for Library from Appropriation	$392 69
" " " " J. W. D. French Fund	192 91
" " " " J. S. Farlow Fund	99 22
" " Heating	964 60
" " Lighting	2,170 14
" " Labor	2,192 18
" " Stationery and Printing	1,748 21
" " Postage	196 00
" " Insurance	503 88
" " Incidentals	1,981 73
" " Repairs	4,148 29
" " Committee on Lectures and Publications	390 00
" " Salaries of Officers	4,152 00
" " " Committee on Plants and Flowers	362 55
" " " " " Fruits	186 00
" " " " " Vegetables	152 00
" " Committee on Prizes & Exhibitions	500 00
" " Expenses Committee on Gardens	332 64
" " Medals	536 94
" " Library Catalogue	480 00
" " Publicity Agent	500 00
" " Prizes for Plants and Flowers	4,045 00
" " Prizes for Fruits	1,605 00
" " Prizes for Vegetables	847 00
" " Prizes for Children's Garden	265 25
" " H. A. Gane Fund	30 00
" " Geo. R. White Medal of Honor	234 02
" " John C. Chaffin Fund	33 00
Balance December 31, 1913, Treasurer and Bursar	6,243 08
	$35,484 33

Cr.

Balance December 31, 1912				$9,999 33
Received Rents			$6,127 64	
"	Exhibitions	2,567 60		
"	less expenses	1,451 18	1,116 42	
"	Membership Fees		932 00	
"	State Bounty		1,000 00	
"	Sundry Donations		27 90	
"	Mount Auburn Cemetery		3,651 06	12,855 02
"	Interest on securities from the following funds:			
	S. Appleton		40 00	
	J. A. Lowell		40 00	
	T. Lyman		440 00	
	J. Bradlee		40 00	
	B. V. French		20 00	
	H. H. Hunnewell		160 00	
	W. J. Walker		94 16	
	L. Whitcomb		20 00	
	B. B. Davis		20 00	
	M. P. Wilder		40 00	
	J. L. Russell		40 00	
	F. B. Hayes		400 00	
	H. A. Gane		40 00	
	J. S. Farlow		100 00	
	J. D. W. French		200 00	
	B. H. Pierce		32 00	
	J. C. Chaffin		40 00	
	B. V. French, No. 2		120 00	
	G. R. White		240 00	
	J. S. Farlow, Newton		116 00	
	J. A. French		200 00	
			2,442 16	
"	Interest and dividends on securities other than those for the above funds		10,187 82	12,629 98
				$35,484 33

Assets.

Real Estate	$518,564 63
Furniture and Exhibition Ware	10,796 96
Library	45,110 47
Plates and History	235 50
$2,000 Kansas City, Clinton, and Springfield Bonds	1,980 00
10,000 Lake Shore and Mich. So. Bonds	10,415 25
21,000 City of Newton Bonds	24,228 75
50,000 Atch. Topeka and S. F. Bonds	44,693 25
50,000 Chicago Burl. and Quincy Bonds	50,012 50
10,000 Chicago and West Mich. Bonds	9,987 50
25,000 K. C. F. S. and Memphis Bonds	27,523 75
50,000 C. B. and Q. Illinois Bonds	51,625 00
8,000 Boston and Maine Bonds	8,710 00
5,000 West End Street R'y Bonds	5,162 50
4,000 Amer. Tel. and Tel. Bonds	4,110 00
12,000 Pacific Telephone Bonds	11,670 00
260 shares General Electric Stock	12,909 90
Hayes and Loring, Trustees	2,308 66
Cash in hands of Treasurer and Bursar	6,243 08
	$846,287 70

Liabilities.

Funds invested in Bonds and Stocks:

S. Appleton	Fund	$1,000 00
J. A. Lowell	"	1,000 00
T. Lyman	"	11,000 00
J. Bradlee	"	1,000 00
B. V. French	"	500 00
H. H. Hunnewell	"	4,000 00
W. J. Walker	"	2,354 43
L. Whitcomb	"	500 00
B. B. Davis	"	500 00
M. P. Wilder	"	1,000 00
J. L. Russell	"	1,000 00
F. B. Hayes	"	10,000 00
H. A. Gane	"	1,169 00
J. S. Farlow	"	2,500 78
J. D. W. French	"	5,007 09
B. H. Pierce	"	800 00
J. C. Chaffin	"	1,231 89

B. V. French, No. 2 Fund	$3,000 00		
J. A. French "	5,000 00		
G. R. White "	6,000 00		
J. S. Farlow, Newton "	2,900 42	$61,463	61
Surplus		784,824	09
		$846,287	70

WALTER HUNNEWELL,
Treasurer.

MEMBERSHIP OF MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 31, 1913.

Life Members, December 31, 1912		693	
Added in 1913		18	
Changed from Annual		2	
		713	
Deceased		24	689
Annual Members, December 31, 1912		146	
Added in 1913		11	
		157	
Deceased	4		
Changed to Life	2		
Resigned	2	8	149
Membership, December 31, 1913			838

INCOME FROM MEMBERSHIP

18 New Life members at $30	$540 00
11 New Annual Members at $10	110 00
Assessments for 1913	282 00
	932 00

WALTER HUNNEWELL,
Treasurer.

AUDITOR'S CERTIFICATE.

40 State Street, Boston,
April 1, 1914.

To the Finance Committee of the
Massachusetts Horticultural Society.

Gentlemen:

As requested by you I have made a thorough audit of the books and general accounting affairs of the Massachusetts Horticultural Society for the year which ended with the thirty-first day of December, 1913, and herewith submit to you my report of the same.

Report.

I have proved the correctness of the ledger, journal, and cash books and the small books tributary to the cash books, and saw that all balances were properly carried forward. I examined all vouchers and checks representing the disbursements during the year and found the amount of cash required by the cash book upon the first day of January, 1914, to have been on hand, and also examined the securities of the Society, finding them in all details in accordance with the requirements of the records. I traced all postings from the journal and cash books into the ledger and certify that the balance sheet taken from it as of the 31st of December, 1913, is a correct abstract and that the Treasurer's statement of the assets and liabilities of the Society upon said date is true to the best of my knowledge and belief.

In short, I satisfied myself that the work in connection with the accounting affairs of the Society is being intelligently and faithfully performed and that the books and papers of the Society are in commendable condition.

Yours very respectfully,

Andrew Stewart,
Certified Public Accountant.

THE ANNUAL MEETING, NOVEMBER 15, 1913.

ANNUAL MEETING FOR THE YEAR 1913.

The Annual Meeting of the Massachusetts Horticultural Society for the year 1913 was held at Horticultural Hall, Boston, on Saturday, November 15, at twelve o'clock, noon, with Vice-President Hunnewell in the chair.

The call for the meeting was read by the Secretary and the record of the previous meeting was read and duly approved.

The President announced that the Board of Trustees had approved an appropriation of $6000.00 in addition to the income of the special prize funds of the Society ($2289.71) for prizes and gratuities for the ensuing year. He then appointed Messrs. Edward B. Wilder, J. Allen Crosby, and William P. Rich a committee to receive, assort, and count the ballots, and to report the number.

There being no other business the President declared a recess until three o'clock with Mr. Wilder as chairman.

At three o'clock Chairman Wilder declared the polls closed and the committee on balloting submitted the following report:

Whole number of ballots cast 40.

For President, John K. M. L. Farquhar received 39. For Vice President, for two years, Walter Hunnewell received 40. For Trustee, for one year, F. Lothrop Ames received 40. For Trustees, for three years, Ernest B. Dane received 39, Stephen M. Weld, 40, Wilfrid Wheeler, 40, and Edward B. Wilder, 40. For Delegate to the State Board of Agriculture, Edward B. Wilder received 40. For Nominating Committee, Herbert A. Clark, Philip Dexter, Arthur H. Fewkes, Frederick S. Moseley, and John L. Smith, each received 39.

Chairman Wilder then declared the following named persons to be the duly elected officers of the Society for the year 1914:

President	JOHN K. M. L. FARQUHAR
Vice President	WALTER HUNNEWELL
(for two years)	
Trustees	F. LOTHROP AMES
	ERNEST B. DANE
	STEPHEN M. WELD
	WILFRID WHEELER
	EDWARD B. WILDER
Nominating Committee	HERBERT A. CLARK
	PHILIP DEXTER
	ARTHUR H. FEWKES
	FREDERICK S. MOSELEY
	JOHN L. SMITH

No further business being presented the meeting was dissolved.

WILLIAM P. RICH,
Secretary.

NECROLOGY, 1913.

NECROLOGY, 1913.

GEORGE O. WALES of Braintree, Massachusetts, died at his home in that town January 4, 1913. He had been a member of the Society since 1880.

FRANCIS BLAKE, scientist and inventor, died at his home in Weston, Massachusetts, January 19, 1913, at the age of 62. His interest in horticulture was manifested in his fine estate of a hundred acres in Weston where in addition to ornamental trees and flowers he grew many varieties of fruits trained on the stone walls surrounding his gardens. He became a member of the Society in 1893.

THOMAS VOLNEY MUNSON, who died January 21, 1913, was elected a Corresponding Member of the Society in 1909. Mr. Munson was born in Illinois, September 26, 1843, and his early years were spent on a farm. Later in life he moved to Denison, Texas, where he established himself in the nursery business specializing in the culture and breeding of grapes. In this line he achieved a world-wide reputation and his volume on the Foundations of American Grape Culture, published in 1909, is one of the most important contributions to horticulture in recent years.

JAMES H. CLAPP of Dorchester, a member of the Society since 1876, died February 11, 1913, in his 61st year. Mr. Clapp was a member of a family prominent in New England horticulture. His father, the late Lemuel Clapp, was a famous fruit grower on his farm in Dorchester and was the originator of the Clapp's Favorite pear.

EDWARD J. MITTON of Brookline, Massachusetts, died at his home there February 11, 1913, at the age of 66. Mr. Mitton was born in London, England, March 25, 1847. He came to this

country early in life and found employment in Boston with the well-known firm of Jordan Marsh Co. with whom he was associated during the remainder of his life, being vice president of the Company at the time of his death.

He was much interested in horticultural matters and for many years was a regular contributor of the products of his gardens and greenhouses to the exhibitions of the Society of which he became a member in 1896.

GEORGE ANSLEY MUDGE, formerly of Brookline, Massachusetts, died at his home in Portsmouth, New Hampshire, March 9, 1913, at the age of 80 years. While living in Brookline he became a member of the Society in 1859.

CHRISTOPHER C. SHAW of Milford, New Hampshire, died at his home in that town March 23, 1913, in the 89th year of his age. Mr. Shaw was formerly a resident of Boston and joined the Society in 1859. His early life was spent on a farm but in later years he was engaged in the dry goods business in Milford and Boston, though still retaining his interest in horticultural and agricultural matters. He was much interested in fruit culture and was well known throughout the New England states as an exhibitor of fruits at the various state and county exhibitions. He was an active member of many organizations for the advancement of horticulture and was for a number of years President of the New Hampshire Horticultural Society.

WILLIAM GILLARD of Boston, a member of the Society since 1865, died April 18, 1913, at the age of 89 years. Mr. Gillard was born in Devonshire, England, in 1824 and came to the United States at the age of 22. He settled in Boston where most of his life was spent. He was a tailor by trade and was a great lover of flower and vegetable culture, spending his leisure hours in that work.

JOSEPH GODDARD of Roxbury, Massachusetts, died May 5, 1913. He was elected to membership in the Society in 1890.

HORACE EATON, formerly of Quincy, Massachusetts, died in Boston May 10, 1913, in his 81st year. Mr. Eaton was born in

Concord, New Hampshire, in 1832 and when a young man came to Boston and engaged in the leather business which he followed for many years. He was interested in horticultural matters, specializing in fruit growing on his farm in Maine. He became a member of the Society in 1870.

JOHN HAYS GARDINER of Brookline, Massachusetts, died in Boston, May 14, 1913, at the age of 50 years. He was born in Gardiner, Maine, April 6, 1863, and graduated from Harvard College in the class of '85. In recent years he was assistant professor in English literature at Harvard. He became a member of the Society in 1904.

WILLIAM C. STRONG of Newton, Massachusetts, a member of the Society since 1848, died in New York May 14, 1913, in his 90th year. Probably no man in the history of the Society maintained a longer period of active service in its interest than did Mr. Strong. From the year 1851 until 1903 inclusive his name appears on the records of the Society as an officer or a member of some committee and as President for the years 1871 to 1874.

Mr. Strong was born in Hardwick, Vermont, and came to Newton in 1848 establishing a nursery business in the adjoining town of Brighton which he carried on for many years. He was a recognized authority in fruit growing and in 1867 published a book on the culture of the grape.

He also gave many addresses and lectures on a great variety of horticultural subjects which are recorded in the Annual Transactions of the Society.

GEORGE GLOVER CROCKER, a member of the Society since 1899, died at his summer home in Cohasset, Massachusetts, May 26, 1913, at the age of 69. Mr. Crocker was born in Boston, December 15, 1843, was graduated from Harvard College in the class of 1864, and for many years occupied various positions of trust and responsibility in his native city.

JOSEPH THORPE of Taunton, Massachusetts, died in that city May 30, 1913. He became a member of the Society in 1904 and was a frequent exhibitor, especially of dahlias, at its exhibitions.

LOUIS E. MERRY of West Somerville, Massachusetts, a member of the Society since 1908, died in Boston, June 11, 1913, at the age of 67.

PATRICK T. QUINN, a corresponding member of the Society since 1875, died at his home in Newark, New Jersey, June 11, 1913, at the age of 82 years. Mr. Quinn was an authority on agricultural subjects and was well known as an editor and writer.

FRANCIS L. BANFIELD, M. D., formerly of Boston, died at his home in Worcester, Massachusetts, June 26, 1913, in his 70th year. He had been a member of the Society since 1868.

CHARLES DEMING SIAS of Boston, died at his country home in Wenham, Massachusetts, June 27, 1913, at the age of 64. Mr. Sias was much interested in horticulture and was a frequent exhibitor of the products of his gardens at the exhibitions of the Society. He was elected to membership in 1899.

JOSEPH CLARK formerly of Canton, Massachusetts, but in later years a resident of Manchester, died in the latter town July 13, 1913, at the age of 77. Mr. Clark was an expert professional gardener and had served for a number of years on the plant and flower committees of the Society. He had been a member since 1865.

JOHN HENRY BROOKS of Milton, Massachusetts, died at his home in that town, July 21, 1913, in his 65th year. He was elected to membership in the Society in 1889.

JOHN CARR of Roxbury, Massachusetts, a member of the Society since 1891, died August 9, 1913, at the age of 85.

GEORGE MCWILLIAM, of Whitinsville, Massachusetts, died in that town September 13, 1913. Mr. McWilliam was born in Scotland, in 1846. He was well known amongst the horticulturists of Massachusetts and had been employed as a gardener on the estate of Mrs. G. M. Whitin at Whitinsville for thirty years. He

was especially interested in orchid culture and was a frequent exhibitor at the exhibitions of the Society of which he had been a member since 1886.

FRANCIS BARTLETT of Boston, a member of the Society since 1899, died September 23, 1913.

FRANCIS H. LEE, of Salem, Massachusetts, died at his home there, October 7, 1913, at the age of 77. He was engaged in the banking business in Boston for many years and had been a member of the Society since 1875.

THORNTON KIRKLAND LOTHROP of Boston, died November 2, 1913, in his 84th year. He was elected to membership in the Society in 1865.

CHARLES W. AMORY of Boston, a member of the Society since 1899, died November 5, 1913, at the age of 71.

CHARLES BARTLETT LANCASTER died at his home in Newton Center, Massachusetts, December 22, 1913, in his 77th year. He had been a member of the Society since 1865.

SIR TREVOR LAWRENCE, a corresponding member of the Society since 1900, died at his residence in Dorking, England, December 23, 1913, in his 82nd year.

He was much devoted to horticultural pursuits and was especially interested in orchid culture. For a period of 28 years he was president of the Royal Horticultural Society of London.

OFFICERS, COMMITTEES, AND MEMBERS, 1913.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1913.

President.

JOHN K. M. L. FARQUHAR, of Boston.

Vice-Presidents.

WALTER HUNNEWELL, of Boston.
RICHARD M. SALTONSTALL, of Boston.

Treasurer.

WALTER HUNNEWELL, of Boston

Secretary.

WILLIAM P. RICH, of Chelsea.*

Trustees.

THOMAS ALLEN, of Boston.
F. LOTHROP AMES, of North Easton.
ERNEST B. DANE, of Brookline.
WILLIAM DOWNS, of Chestnut Hill.
ARTHUR F. ESTABROOK, of Boston.
NATHANIEL T. KIDDER, of Milton.
CHARLES W. PARKER, of Boston.
THOMAS ROLAND, of Nahant.
CHARLES S. SARGENT, of Brookline.
STEPHEN M. WELD, of Wareham.
WILFRID WHEELER, of Concord.
EDWARD B. WILDER, of Dorchester.

Nominating Committee.

HAROLD L. FROST, of Arlington.
HENRY S. HUNNEWELL, of Boston.
THEOPHILUS D. HATFIELD, of Wellesley.
HERBERT W. RAWSON, of Arlington.
WILLIAM SIM, of Cliftondale.

* Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

COMMITTEES FOR 1918.

Finance Committee.

WALTER HUNNEWELL, *Chairman.*
ARTHUR F. ESTABROOK, STEPHEN M. WELD.

Membership Committee.

JOHN K. M. L. FARQUHAR,
WALTER HUNNEWELL, RICHARD M. SALTONSTALL.

Committee on Library.

CHARLES S. SARGENT, *Chairman.*
ERNEST B. DANE, CHARLES S. MINOT.

Committee on Lectures and Publications.

WILFRID WHEELER, *Chairman.*
GEORGE B. DORR, F. C. SEARS.

Committee on Prizes and Exhibitions.

JAMES WHEELER, *Chairman.*
DUNCAN FINLAYSON, S. J. GODDARD, T. D. HATFIELD,
DR. W. G. KENDALL, EDWARD B. WILDER,
ALEXANDER MONTGOMERY.

Committee on Plants and Flowers.

T. D. HATFIELD, *Chairman.*
ARTHUR H. FEWKES, DONALD McKENZIE,
JAMES MARLBOROUGH, WILLIAM NICHOLSON,
WILLIAM SIM.

Committee on Fruits.

EDWARD B. WILDER, *Chairman.*
WILLIAM DOWNS, HAROLD L. FROST.

Committee on Vegetables.

DUNCAN FINLAYSON, *Chairman.*
WILLIAM N. CRAIG, HENRY M. HOWARD.

Committee on Gardens.

JOHN K. M. L. FARQUHAR, *Chairman.*
DAVID R. CRAIG, JACKSON T. DAWSON, ARTHUR H. FEWKES,
THOMAS J. GREY, T. D. HATFIELD, RICHARD HITTINGER,
DR. HARRIS KENNEDY, WILLIAM NICHOLSON,
DAVID F. ROY, CHARLES SANDER, WILFRID WHEELER.

Committee on Children's Gardens.

HENRY S. ADAMS, *Chairman.*
HARRY S. RAND, MISS MARGARET A. RAND, WM. P. RICH,
B. HAMMOND TRACY, JAMES WHEELER.

MEMBERS OF THE MASSACHUSETTS HORTICULTURAL SOCIETY, 1913.

Revised to December 31, 1913.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following lists are inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

1900 Dr. Henry S. Pritchett, Washington, D. C.
1900 Albert Viger, President of the National Society of Horticulture of France, Paris.
1897 Hon. James Wilson, Ex-Secretary of Agriculture, Washington, D. C.

CORRESPONDING MEMBERS.

1901 George Francis Atkinson, Professor of Botany in Cornell University, Ithaca, N. Y.
1889 Professor L. H. Bailey, Director of College of Agriculture, Cornell University, Ithaca, N. Y.
1898 John Gilbert Baker, F. R. S., F. L. S., Kew, England.
1875 Professor William J. Beal, Amherst, Mass.
1911 W. J. Bean, Royal Gardens, Kew, England.
1889 Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.
1900 Col. Gustavus B. Brackett, Pomologist of the United States Department of Agriculture, Washington, D. C.
1911 John Dunbar, Park Department, Rochester, N. Y.

1887 Sir W. T. Thiselton Dyer, K. C. M. G., F. R. S., "Witcombe," Gloucester, England.
1875 Parker Earle, President of the American Horticultural Society, Roswell, N. M.
1887 H. J. Elwes, F. R. S., Colesborne, Cheltenham, England.
1889 William G. Farlow, M. D., Professor of Cryptogamic Botany, Harvard University, Cambridge.
1893 B. E. Fernow, University of Toronto, Toronto, Ontario.
1900 Beverly T. Galloway, Horticulturist and Superintendent of Gardens and Grounds of the United States Department of Agriculture, Washington, D. C.
1877 George L. Goodale, M. D., Cambridge, Mass.
1895 Professor Byron D. Halsted, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.
1911 Professor U. P. Hedrick, New York Agricultural Experiment Station, Geneva, N. Y.
1907 Dr. Augustine Henry, Cambridge, England.
1897 J. W. Hoffmann, Colored State University, Orangeburg, S. C.
1906 Senor Don Salvador Izquierdo, Santiago, Chile.
1889 Professor William R. Lazenby, Department of Horticulture and Forestry; Secretary College of Agriculture and Domestic Science, Ohio State University, Columbus, O.
1911 Émile Lemoine, Nancy, France.
1875 T. C. Maxwell, Geneva, N. Y.
1911 J. Ewing Mears, M. D., Philadelphia, Pa.
1911 Wilhelm Miller, Editor of Country Life in America, Garden City, N. Y.
1898 Sir Frederick W. Moore, Curator of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.
1887 Sir Daniel Morris, C. M. G., D.Sc., M. A., F. L. S.
1898 Peter Nøvik, Secretary of the Norwegian Horticultural Society, Christiania.
1912 C. Harman Payne, London, England.
1906 Lieut. Col. David Prain, Director of the Royal Botanic Gardens, Kew, England.
1894 Cavaliere Enrico Ragusa, Palermo, Sicily.
1906 Dr. Henry L. Ridley, Director of the Botanic Garden, Singapore.
1898 Benjamin Lincoln Robinson, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge.
1875 William Robinson, Editor of Gardening Illustrated, London.
1899 William Salway, Superintendent of Spring Grove Cemetery Cincinnati, O.
1875 Robert W. Starr, Wolfville, N. S.
1893 William Trelease, St. Louis, Mo.

1882 H. J. Veitch, Chelsea, England.
1905 Maurice L. de Vilmorin, Paris, France.
1905 Philippe L. de Vilmorin, Paris, France.
1912 Professor Hugo de Vries, University of Amsterdam, Amsterdam, Holland.
1894 William Watson, Curator of Royal Botanic Gardens, Kew, England.
1906 Miss E. Willmott, Essex, England.
1911 E. H. Wilson, Jamaica Plain, Mass.
1901 Professor L. Wittmack, Secretary of the Royal Prussian Horticultural Society, Berlin, Prussia.

LIFE MEMBERS.

1899 Adams, Mrs. Charles Francis, South Lincoln.
1907 Adams, George E., Kingston, R. I.
1897 Adams, Henry Saxton, Jamaica Plain.
1899 Agassiz, Mrs. George R., Yarmouth Port.
1894 Allen, Hon. Charles H., Lowell.
1898 Allen, Thomas, Boston.
1899 Ames, F. Lothrop, North Easton.
1899 Ames, John S., North Easton.
1899 Ames, Miss Mary S., North Easton.
1894 Ames, Oakes, North Easton.
1899 Ames, Oliver, North Easton.
1900 Ames, Mrs. Oliver, Sr., North Easton.
1900 Ames, Miss Susan E., North Easton.
1867 Amory, Frederic, Boston.
1899 Anderson, Larz, Brookline.
1911 Anderson, William, South Lancaster.
1864 Andrews, Charles L., Milton.
1871 Appleton, Hon. Francis H., Boston.
1913 Appleton, Henry Saltonstall, Boston.
1900 Arnold, Mrs. George Francis, Brookline.
1894 Ash, John, Pomfret Centre, Conn.
1890 Atkins, Edwin F., Belmont.
1899 Ayer, James B., Boston.

1912 Bache, James S., Sharon, Conn.
1905 Backer, Clarence A., Melrose.
1905 Badger, Walter I., Cambridge.
1894 Bailey, Jason S., West Roxbury.
1902 Bailey, Robert M., Dedham.
1902 Baker, Clifton P., Dedham.
1901 Baker, James E., South Lincoln.
1904 Balch, Joseph, Dedham.
1909 Baldwin, Frank F., Hopkinton.
1888 Barber, J. Wesley, Newton.
1904 Barker, George, Swampscott.
1905 Barnard, George E., Ipswich.
1866 Barnes, Walter S., Boston.
1904 Barney, Arthur F., Dorchester.
1867 Barney, Levi C., Boston.
1897 Barry, John Marshall, Boston.
1893 Barry, William C., Rochester, N. Y.
1901 Bartlett, Miss Mary F., Boston.
1901 Bates, Miss Mary D., Ipswich.
1899 Baylies, Walter C., Taunton.
1905 Beal, Thomas P., Boston.
1891 Becker, Frederick C., Cambridge.
1876 Beckford, Daniel R., Jr., Dedham.
1894 Beebe, E. Pierson, Boston.
1890 Beebe, Franklin H., Boston.
1894 Beebe, J. Arthur, Boston.
1905 Bemis, Frank B., Beverly.
1899 Bigelow, Albert S., Cohasset.
1899 Bigelow, Joseph S., Cohasset.
1899 Bigelow, Dr. William Sturgis, Boston.
1899 Black, George N., Manchester.
1885 Blake, Mrs. Arthur W., Brookline.
1897 Blake, Edward D., Boston.

1908 Blood, Eldredge H., Cambridge.
1905 Boardman, Miss Elisa D., Boston.
1894 Boardman, Samuel M., Hyde Park.
1899 Boardman, T. Dennie, Manchester.
1875 Bolles, William P., M. D., Roxbury.
1894 Bosler, Frank C., Carlisle, Penn.
1887 Bowditch, Charles P., Jamaica Plain.
1897 Bowditch, Ernest W., Milton.
1883 Bowditch, James H., Brookline.
1894 Bowditch, Nathaniel I., Framingham.
1877 Bowditch, William E., Roxbury.
1878 Bowker, William H., Boston.
1913 Brackett, C Henry B., Boston.
1912 Bradley, Charles H., Boston.
1900 Breck, Joseph Francis, Waban.
1899 Bremer, Mrs. John L., Manchester.
1871 Bresee, Albert, Hubbardton, Vt.
1905 Brewster, William, Cambridge.
1910 Briggs, Mrs. George R., Plymouth.
1897 Briggs, William S., Lincoln.
1873 Brigham, William T., Honolulu, Hawaii.
1909 Brooke, Edmund G., Jr., Providence, R. I.
1899 Brooks, Peter C., Boston.
1899 Brooks, Shepherd, Boston.
1912 Brooks, Walter D., Milton.
1909 Brown, Mrs. John Carter, Providence, R. I.
1899 Brown, Samuel N., Boston.
1907 Brush, Charles N., Brookline.
1906 Buitta, Vincent, Newton Upper Falls.
1897 Burlen, William H., East Holliston.
1895 Burnett, Harry, Southborough.
1911 Burnett, John T., Southborough.
1911 Burpee, W. Atlee, Philadelphia, Pa.
1909 Burr, I. Tucker, Milton.
1906 Burrage, Albert C., Boston.
1868 Butler, Aaron, Wakefield.
1907 Butterworth, George William, South Framingham.
1906 Butterworth, J. Thomas, South Framingham.
1905 Buttrick, Stedman, Concord.

1902 Cabot, George E., Boston.
1870 Calder, Augustus P., Mattapan.
1896 Cameron, Robert, Cambridge.
1908 Campbell, Charles A., Ipswich.
1913 Campbell, Chester I., Wollaston.
1891 Campbell, Francis, Cambridge.
1905 Carr, Samuel, Boston.
1893 Carter, Charles N., Needham.
1867 Carter, Miss Maria E., Woburn.
1885 Cartwright, George, Dedham.
1899 Casas, W. B. de las, Malden.
1911 Case, Miss Marian Roby, Weston.
1873 Chamberlain, Chauncy W., Boston.
1909 Chamberlain, Montague, Groton.
1903 Chapman, John L., Prides Crossing.
1878 Chase, Joseph S., Malden.
1909 Chase, Philip Putnam, Milton.
1895 Cheney, Mrs. Elizabeth S., Wellesley.
1894 Christie, William, Everett.
1876 Clapp, Edward B., Dorchester.
1871 Clapp, William C., Dorchester.
1896 Clark, B. Preston, Cohasset.
1896 Clark, Miss Eleanor J., Pomfret Centre, Conn.
1907 Clark, Herbert A., Belmont.
1890 Clark, J. Warren, Millis.
1910 Clark, Winslow, Milton.
1871 Clarke, Miss Cora H., Boston.
1899 Clarke, Eliot C., Boston.
1895 Clough, Micajah Pratt, Lynn.

1894 Cobb, John C., Milton.
1874 Coburn, Isaac E., Everett.
1906 Codman, Miss Catherine A., Westwood.
1871 Codman, James M., Brookline.
1901 Coe, Miss Mary Alma, Boston.
1903 Cogswell, Edward R., Jr., Newton Highlands.
1900 Cole, Edward E., Boston.
1887 Collamore, Miss Helen, Boston.
1882 Collins, Frank S., Malden.
1900 Colton, Samuel H., Worcester.
1902 Comley, Norris F., Lexington.
1899 Converse, Col. H. E., Marion.
1913 Cook, Thomas N., Watertown.
1902 Coolidge, Harold J., Boston.
1899 Coolidge, J. Randolph, Chestnut Hill.
1899 Coolidge, Mrs. J. Randolph, Chestnut Hill.
1892 Cottle, Henry C., Boston.
1913 Cox, Simon F., Mattapan.
1892 Cox, Thomas A., Dorchester.
1910 Craig, David R., Boston.
1901 Craig, William Nicol, Brookline.
1899 Crane, Zenas, Dalton.
1891 Crawford, Dr. Sarah M., Roxbury.
1891 Crocker, Miss Sarah H., Boston.
1887 Crosby, George E., West Medford.
1901 Cross, Alfred Richard, Nantasket.
1909 Cumner, Mrs. Nellie B., Brookline.
1856 Curtis, Charles F., Jamaica Plain.
1899 Curtis, Charles P., Boston.
1895 Cushing, Livingston, Weston.
1906 Cutler, Mrs. Charles F., Boston.
1903 Cutler, Judge Samuel R., Revere.
1897 Damon, Frederick W., Arlington.
1908 Dane, Ernest B., Brookline.
1908 Dane, Mrs. Ernest B., Brookline.
1899 Daniels, Dr. Edwin A., Boston.
1909 Danielson, Mrs. J. DeForest, Boston.
1892 Davenport, Albert M., Watertown.
1902 Davis, Arthur E., Dover.
1902 Davis, Mrs. Arthur E., Dover.
1913 Davis, Bancroft Chandler, Weston.
1899 Davis, L. Shannon, Brookline.
1909 Dawson, Henry Sargent, Jamaica Plain.
1872 Dawson, Jackson T., Jamaica Plain.
1905 Day, Frank A., Newton.
1905 Day, Henry B., West Newton.
1873 Denny, Clarence H., Boston.
1904 Dexter, Gordon, Beverly Farms.
1904 Dexter, Philip, Beverly.
1866 Dike, Charles C., Stoneham.
1902 Doane, Edgar Howard, Wenham.
1896 Donald, William, Cold Spring Harbor, N. Y.
1900 Donaldson, James, Roxbury.
1907 Doten, Scott T., Jamaica Plain.
1910 Downs, William, Chestnut Hill.
1893 Dowse, William B. H., West Newton.
1894 Draper, Hon. Eben S., Hopedale.
1899 Draper, George A., Hopedale.
1896 Dreer, William F., Philadelphia, Pa.
1897 Dumaresq, Herbert, Chestnut Hill.
1899 Duncan, James L., New York, N. Y.
1902 Duncan, John W., Spokane, Wash.
1896 Dunlap, James H., Nashua, N. H.

1909 Dupuy, Louis, Whitestone. L. I., N. Y.
1852 Durfee, George B., Fall River.
1880 Dutcher, Frank J., Hopedale.
1900 Dwight, Theodore F., Kendal Green.
1902 Dyer, Herbert H., Arlington.

1912 Eaton, Harris D., Southborough.
1911 Edgar, Mrs. Rose H., Waverley.
1912 Edgar, William Percival, Jamaica Plain.
1895 Eldredge, H. Fisher, Boston.
1887 Elliott, Mrs. John W., Boston.
1888 Elliott, William H., Brighton.
1903 Ellsworth, J. Lewis, Worcester.
1907 Emerson, Nathaniel W., M.D., Boston.
1898 Endicott, William, Boston.
1894 Endicott, William, Jr., Boston.
1899 Endicott, William C., Danvers.
1897 Estabrook, Arthur F., Boston.
1905 Estabrook, Mrs. Arthur F., Boston.
1907 Eustis, Miss Elizabeth M., Brookline.
1907 Eustis, Miss Mary St. Barbe, Brookline.

1881 Fairchild, Charles, New York, N. Y.
1877 Falconer, William, Pittsburg, Pa.
1884 Farlow, Lewis H., Boston.
1896 Farnsworth, Mrs. William, Dedham.
1890 Farquhar, James F. M., Roslindale.
1891 Farquhar, John K. M. L., Roxbury.
1884 Farquhar, Robert, North Cambridge.
1873 Faxon, John, Quincy.
1899 Fay, H. H., Woods Hole.
1908 Fay, Wilton B., West Medford.
1899 Fessenden, George B., Allston.
1883 Fewkes, Arthur H., Newton Highlands.
1904 Finlayson, Duncan, Jamaica Plain.
1892 Finlayson, Kenneth, Jamaica Plain.
1901 Fisher, Peter, Ellis.
1910 Flanagan, Joseph F., Newton.
1882 Fletcher, George V., Belmont.
1883 Fletcher, J. Henry, Belmont.
1909 Forbes, Charles Stewart, Boston.
1909 Forbes, Mrs. J. Malcolm, Milton.
1909 Forbes, Mrs. William H., Milton.
1899 Foster, Charles H. W., Needham.
1883 Foster, Francis C., Cambridge.
1885 Fottler, John, Jr., Dorchester.
1881 Fowle, George W., Jamaica Plain.
1911 Freeman, Mrs. James G., Boston.
1910 French, Mrs. Albert M., Reading.
1899 French, Miss Caroline L. W., Boston.
1892 French, S. Waldo, Newtonville.
1893 French, W. Clifford, Brookline.
1882 Frohock, Roscoe R., Boston.
1903 Frost, Harold L., Arlington.
1900 Frost, Irving B., Belmont.

1910 Galloupe, Frederic R., Lexington.
1901 Gardner, Mrs. Augustus P., Hamilton.
1895 Gardner, George A., Boston.
1895 Gardner, George P., Boston.
1899 Gardner, John L., Boston.
1899 Gardner, Mrs. John L., Brookline.
1899 Gardner, William Amory, Groton.

1904 Garratt, Allan V., Holliston.
1899 Gaston, William A., Boston.
1911 Gavin, Frank D., Manchester.
1910 Geiger, Albert, Jr., Brookline.
1911 Gill, Miss Adeline Bradbury, Medford.
1911 Gill, Miss Eliza M., Medford.
1865 Gill, Mrs. E. M., Medford.
1887 Gill, George B., Medford.
1870 Gilson, F. Howard, Wellesley Hills.
1907 Goddard, Samuel J., Framingham.
1904 Goodale, Dr. Joseph L., Boston.
1885 Goodell, L. W., Dwight.
1892 Gowing, Mrs. Clara E., Kendal Green.
1899 Gray, Mrs. John C., Boston.
1910 Green, Mrs. Francis Cushing, Buzzards Bay.
1905 Greenough, Mrs. Charles P., Brookline.
1912 Greenough, Mrs. David S., Jamaica Plain.
1899 Grew, Edward S., Boston.

1897 Hale, James O., Byfield.
1873 Hall, Edwin A., Cambridgeport.
1912 Hall, Mrs. George G., Boston.
1899 Hall, Jackson E., Foxboro.
1897 Hall, Osborn B., Malden.
1910 Halloran, Edward J., Roxbury.
1913 Handler, Max Paul, South Natick.
1863 Harding, George W., Arlington.
1869 Harding, Louis B., Chestnut Hill.
1871 Hardy, F. D., Cambridgeport.
1905 Hardy, Miss Susan White, Boston.
1889 Hargraves, William J., Jamaica Plain.
1887 Harris, Thaddeus William, A. M., Littleton, N. H.
1910 Harris, Prof. William Fenwick, Cambridge.
1909 Hart, Francis R., Milton.
1899 Hartshorn, Arthur E., Worcester.
1895 Harwood, George Fred, Newton.
1884 Hastings, Levi W., Brookline.
1906 Hauthaway, Edwin D., Sharon.
1891 Hawken, Mrs. Thomas, Rockland, Me.
1899 Hayward, George P., Chestnut Hill.
1905 Head, Thomas W., Bergenfield, N. J.
1913 Heeremans, F., Lenox.
1903 Hellier, Charles E., Boston.
1888 Hemenway, Augustus, Canton.
1899 Hemenway, Mrs. Augustus, Canton.
1884 Henshaw, Joseph P. B., Boston.
1899 Henshaw, Samuel, Cambridge.
1901 Heurlin, Julius, South Braintree.
1894 Hewett, Miss Mary C., Cambridge.
1900 Higginson, Francis L., Boston.
1902 Higginson, Mrs. Henry L., Boston.
1866 Hilbourn, A. J., Boston.
1886 Hittinger, Jacob, Belmont.
1911 Hittinger, Richard, Belmont.
1895 Hoitt, Hon. Charles W., Nashua, N. H.
1905 Holbrook, E. Everett, Boston.
1899 Hollingsworth, Z. T., Boston.
1881 Hollis, George W., Allston.
1891 Holmes, Edward J., Boston.
1876 Holt, Mrs. Stephen A., Cambridge.
1900 Holt, William W., Norway, Maine.
1899 Hood, The Hon. Mrs. Ellen, Sheen, Surrey, Eng.
1899 Hooper, William, Manchester.
1913 Hopewell, John, Newton.
1888 Horsford, Miss Kate, Cambridge.
1912 Horton, Arthur E., Lexington.
1902 Hosmer, Oscar, Wenham.

1907 Houghton, Clement S., Chestnut Hill.
1910 Houghton, Miss Elizabeth G., Boston.
1872 Hovey, Charles H., South Pasadena, Cal.
1884 Hovey, Stillman S., Woburn.
1904 Howard, Henry M., West Newton.
1896 Howard, Joseph W., Somerville.
1905 Hoyt, William J., Manchester. N. H.
1896 Hubbard, Charles Wells, Weston.
1865 Hubbard, James C., Everett.
1913 Huebner, H., Groton.
1875 Humphrey, George W., Dedham.
1912 Hunnewell, F. W., 2d., Wellesley.
1893 Hunnewell, Henry Sargent, Wellesley.
1912 Hunnewell, Mrs. Henry S., Wellesley.
1882 Hunnewell, Walter, Wellesley.
1912 Hunnewell, Walter, Jr., Wellesley.
1892 Hunt, Dudley F., Reading.
1866 Hunt, Franklin, Charlestown, N. H.
1880 Hunt, William H., Concord.
1904 Hutchins, Rev. Charles Lewis, Concord.

1893 Jack, John George, East Walpole.
1886 Jackson, Charles L., Boston.
1884 Jackson, Robert T., Cambridge.
1902 James, Ellerton, Milton.
1902 James, Mrs. Ellerton, Milton.
1899 James, George Abbot, Nahant.
1910 Jaques, Herbert, Chestnut Hill.
1913 Jeffries, John Temple L., Cambridge.
1899 Jeffries, William A., Boston.
1865 Jenks, Charles W., Bedford.
1905 Johnson, Arthur S., Boston.
1885 Johnson, J. Frank, Malden.
1907 Jones, Mrs. Clarence W., Brookline.
1896 Jones, Jerome, Brookline.
1897 Jones, Dr. Mary E., Boston.
1899 Jordan, Eben D., Boston.
1900 Jordan, Henry G., Brookline.
1888 Jose, Edwin H., Cambridgeport.

1897 Kellen, William V., Marion.
1886 Kelly, George B., Jamaica Plain.
1848 Kendall, D. S., Woodstock, Ont.
1868 Kendall, Edward, Cambridgeport.
1891 Kendall, Dr. Walter G., Atlantic.
1868 Kennedy, George G., M. D., Milton.
1909 Kennedy, Harris, M. D., Milton.
1905 Keyes, Mrs. Emma Mayer, Boston.
1891 Keyes, John M., Concord.
1889 Kidder, Charles A., Southborough.
1910 Kidder, Mrs. Henry P., Boston.
1880 Kidder, Nathaniel T., Milton.
1899 Kimball, David P., Boston.
1903 Kimball, Richard D., Waban.
1899 King, D. Webster, Boston.
1865 Kingman, Abner A., Wakefield.
1899 Kinney, H. R., Worcester.
1906 Kinnicutt, Mrs. Leonard P., Worcester.
1904 Kirkland, Archie Howard, Reading.

1899 Lamb, Horatio A., Milton.
1913 Lancaster, Dr. Walter B., South Framingham.
1905 Lane, Gardiner M., Boston.
1899 Lanier, Charles, Lenox.
1895 Lawrence, Amos A., New York, N. Y.

1876 Lawrence, James, Groton.
1873 Lawrence, John, Groton.
1899 Lawrence, Rt. Rev. William, Boston.
1895 Lee, Daniel D., Jamaica Plain.
1880 Leeson, Hon. Joseph R., Newton Centre.
1902 Leighton, George B., Monadnock, N. H.
1871 Lemme, Frederick, Charlestown.
1903 Libby, Charles W., Medford.
1904 Lindsey, N. Allen, Marblehead.
1887 Little, James L., Brookline.
1899 Little, John Mason, Swampscott.
1899 Locke, Isaac H., Belmont.
1891 Lodge, Richard W., Boston.
1897 Loomis, Elihu G., Bedford.
1899 Loring, Augustus P., Beverly.
1905 Loring, David, Boston.
1899 Loring, Mrs. William Caleb, Beverly.
1899 Lowell, Abbott Lawrence, Boston.
1902 Lowell, Miss Amy, Brookline.
1903 Lowell, James A., Chestnut Hill.
1903 Lowell, John, Newton.
1904 Lowell, Miss Lucy, Boston.
1899 Luke, Otis H., Brookline.
1895 Lunt, William W., Hingham.
1895 Lyman, George H., Wareham.

1898 Mabbett, George, Plymouth.
1912 McKay, Alexander, Jamaica Plain.
1911 McKenzie, Donald, Chestnut Hill.
1900 Mackie, George, M. D., Attleboro.
1868 Mahoney, John, Boston.
1892 Mallett, E. B., Jr. Freeport, Me.
1884 Manda, W. A., South Orange, N. J.
1906 Mandell, Mrs. William D., Boston.
1873 Mann, James F., Ipswich.
1887 Manning, J. Woodward, North Wilmington.
1884 Manning, Warren H., Brookline.
1903 Marble, Benjamin C., Manchester.
1909 Marlborough, James, Topsfield.
1913 Marshall, A. A., Fitchburg.
1876 Marshall, Frederick F., Everett.
1898 Marston, Howard, Brookline.
1899 Mason, Miss Ellen F., Boston.
1896 Mason, Col. Frederick, Taunton.
1901 Matthews, Nathan, Boston.
1906 Maxwell, George H., Newton.
1902 Melvin, George, South Framingham.
1885 Melvin, James C., Boston.
1905 Meredith, J. Morris, Topsfield.
1907 Merriam, Charles, Weston.
1881 Merriam, Herbert, Weston.
1884 Metivier, James, Waltham.
1888 Milmore, Mrs. Joseph, Washington, D. C.
1899 Minot, Charles S., Milton.
1908 Minot, Laurence, Boston.
1892 Monteith, David, Hyde Park, Vt.
1896 Montgomery, Alexander, Natick.
1902 Montgomery, Alexander, Jr., Natick.
1896 Moore, George D., Arlington.
1881 Moore, John H., Concord.
1897 Morgan, George H., New York, N. Y.
1913 Morison, Robert S., Cambridge.
1912 Morris, George E., Waltham.
1899 Morse, John T., Boston.
1909 Morse, John Torrey, 3d., Boston.
1910 Morse, Lewis Kennedy, Boxford.

1913 Morse, Robert C., Milton.
1900 Morse, Robert M., Jamaica Plain.
1902 Morton, James H., Mattapan.
1896 Moseley, Charles H., Roxbury.
1909 Moseley, Charles W., Newburyport.
1896 Moseley, Frederick Strong, Newburyport.
1900 Murray, Peter, Fairhaven.
1897 Mutch, John, Waban.

1899 Nevins, Mrs. David, Methuen.
1874 Newman, John R., Winchester.
1874 Newton, Rev. William W., Pittsfield.
1906 Nickerson, William E., Cambridge.
1881 Norton, Charles W., Allston.
1891 Norton, Edward E., Boston.
1869 Norton, Patrick, Dorchester.

1912 O'Conner, John, Brookline.
1898 Olmsted, Frederick Law, Jr., Brookline.
1892 Olmsted, John C., Brookline.
1898 Orpet, Edward O., Lake Forest, Ill.

1909 Page, George, Newton Highlands.
1909 Page, George William, East Billerica.
1900 Page, Mrs. Henrietta, Cambridge.
1884 Paige, Clifton H. Mattapan.
1908 Parker, Augustine H., Dover.
1891 Parker, Charles W., Boston.
1913 Parker, Edgar, North Easton.
1919 Parker, Edward, North Easton.
1891 Parkman, Henry, Boston.
1899 Parsons, John E., Lenox.
1897 Patten, Marcellus A., Tewksbury.
1909 Peabody, Francis, Milton.
1909 Peabody, Mrs. Francis, Milton.
1905 Peabody, Frank E., Boston.
1899 Peabody, George A., Danvers.
1881 Peabody, John E., Salem.
1871 Peck, William G., Arlington.
1907 Peirce, E. Allan, Waltham.
1899 Pentecost, Mrs. Ernest Harvey, Topsfield.
1873 Perry, George W., Malden.
1904 Perry, Oliver Hazard, Lowell.
1899 Pfaff, Col. Charles, South Framingham.
1900 Phillips, John C., North Beverly.
1899 Phillips, Mrs. John C., North Beverly.
1899 Phillips, William, North Beverly.
1895 Pickman, Dudley L., Boston.
1902 Pickman, Mrs. Ellen R., Boston.
1881 Pierce, Dean, Brookline.
1892 Pierce, George Francis, Neponset.
1905 Pierce, Wallace L., Boston.
1905 Pierson, Frank R., Tarrytown, N. Y.
1900 Pond, Preston, Winchester.
1899 Porter, Alexander S., Boston.
1892 Porter, James C., Wollaston.
1884 Pratt, Laban, Dorchester.
1868 Pratt, Robert M., Boston.
1898 Pray, James Sturgis, Cambridge.
1858 Prescott, Eben C., New York, N. Y.
1903 Presson, Alfred, Gloucester.
1903 Preston, Howard Willis, Providence, R. I.
1911 Priest, Lyman F., Gleasondale.
1912 Proctor, Henry H., Boston.
1901 Proctor, Thomas E., Boston.
1899 Putnam, George, Manchester.
1900 Putnam, George J., Brookline.

1886 Quinby, Hosea M., M. D., Worcester.

1891 Raddin, Everett W., North Cambridge.
1889 Rand, Harry S., North Cambridge.
1908 Rand, Miss Margaret A., Cambridge.
1903 Rawson, Herbert W., Arlington.
1882 Ray, James F., Franklin.
1890 Raymond, Walter, Pasadena, Cal.
1891 Read, Charles A., Manchester.
1902 Reardon, Edmund, Cambridgeport.
1892 Reardon, John B., Boston.
1912 Reiff, William, Forest Hills.
1905 Remick, Frank W., West Newton.
1889 Rice, George C., Worcester.
1887 Rich, William P., Chelsea.
1876 Richards, John J., Brookline.
1899 Richardson, Mrs. F. L. W., Charles River Village.
1912 Richardson, H. H., Brookline.
1900 Richardson, Dr. William L., Boston.
1905 Riggs, William Allan, Auburndale.
1886 Ripley, Charles, Dorchester.
1892 Ripley, Ebed L., Hingham Centre.
1903 Robb, Russell, Concord.
1909 Roberts, Miss Anna B., Boston.
1909 Robinson, Alfred E., Lexington.
1871 Robinson, John, Salem.
1885 Robinson, Joseph B., Dorchester.
1900 Rodman, Miss Mary, Concord.
1903 Roffe, Albert H., Newton Centre.
1911 Rogers, Dexter M., Allston.
1899 Rogers, Mrs. Jacob C., Peabody.
1900 Roland, Thomas, Nahant.
1910 Ross, Harold S., Hingham.
1895 Rothwell, James E., Brookline.
1899 Roy, David Frank, Marion.
1881 Ruddick, William H., M. D., South Boston.
1875 Russell, George, Woburn.
1900 Russell, James S., Milton.

1893 Salisbury, William C. G., Brookline.
1912 Saltonstall, John L., Beverly.
1912 Saltonstall, Mrs. John L., Beverly.
1899 Saltonstall, Richard M., Chestnut Hill.
1898 Sanger, Mrs. George P., Boston.
1900 Sargent, Andrew Robeson, Brookline.
1870 Sargent, Charles S., Brookline.
1899 Sargent, Mrs. Charles S., Brookline.
1902 Sargent, Charles Sprague, Jr., Brookline.
1899 Sargent, Mrs. Francis W., Wellesley.
1896 Scorgie, James C., Cambridge.
1864 Scott, Charles, Newton.
1895 Sears, Miss Clara E., Boston.
1899 Sears, Dr. Henry F., Boston.
1899 Sears, Mrs. J. Montgomery, Boston.
1898 Sharp, Miss Helen, Boston.
1899 Shaw, Francis, Wayland.
1899 Shaw, Mrs. Robert G., Wellesley.
1901 Shea, James B., Jamaica Plain.
1906 Sherman, J. P. R., Newton.
1865 Shorey, John L., Lynn.
1892 Shuman, Hon. A., Boston.
1901 Shurtleff, Josiah B., Jr., Revere.
1893 Siebrecht, H. A., New Rochelle, N. Y.
1899 Skinner, Francis, Dedham.
1899 Sleeper, Henry Davis, Boston.
1903 Smiley, Daniel, Lake Mohonk, N. Y.
1888 Smith, Charles S., Lincoln.

1872 Smith, Edward N., San Francisco, Cal.
1911 Smith, John L., Swampscott.
1888 Smith, Thomas Page, Waltham.
1874 Snow, Eugene A., Cambridge.
1899 Sohier, Col. William D., Beverly.
1864 Spaulding, Edward, Weston.
1908 Spaulding, John T., Prides Crossing.
1908 Spaulding, William S., Prides Crossing.
1897 Sprague, Isaac, Wellesley Hills.
1884 Stearns, Charles H., Brookline.
1893 Stearns, Frank W., Newton.
1896 Stedman, Henry R., M. D., Brookline.
1885 Stewart, William J., Winchester.
1901 Stone, Charles A., Newton.
1889 Stone, Charles W., Boston.
1910 Stone, Mrs. Francis H., New Bedford.
1896 Stone, Prof. George E., Amherst.
1849 Stone, George F., Chestnut Hill.
1905 Storrow, James J., Boston.
1905 Stratton, Charles E., Boston.
1906 Strout, Charles S., Biddeford, Me.
1902 Sturgis, Richard Clipston, Boston.
1910 Sullivan, Martin, Jamaica Plain.
1912 Swan, Charles H., Jamaica Plain.
1891 Sweet, Everell F., Malden.
1904 Sylvester, Edmund Q., Hanover.

1899 Taylor, Charles H., Boston.
1913 Tedcastle, Mrs. Arthur W., Hyde Park.
1896 Tenney, Charles H., Methuen.
1912 Thatcher, Arthur E., Bar Harbor, Me.
1898 Thatcher, William, Brookline.
1899 Thayer, Mrs. Alice R., Boston.
1900 Thayer, Bayard, South Lancaster.
1900 Thayer, Mrs. Bayard, South Lancaster.
1899 Thayer, Mrs. Eugene V. R., South Lancaster.
1903 Thayer, Henry J., Boston.
1899 Thayer, John E., South Lancaster.
1899 Thayer, Mrs. John E., South Lancaster.
1899 Thayer, Mrs. Nathaniel, Lancaster.
1899 Thiemann, Hermann, Owosso, Mich.
1899 Thomas, W. B., Manchester.
1910 Thurlow, George C., West Newbury.
1913 Thurlow, Winthrop H., West Newbury.
1874 Tolman, Miss Harriet S., Boston.
1896 Toppan, Roland W., Malden.
1904 Torrey, Elbridge, Dorchester.
1864 Torrey, Everett, Charlestown.
1899 Tower, Miss Ellen May, Lexington.
1901 Tower, Mrs. Helen M., Cambridge.
1891 Travis, Charles B., Brighton.
1893 Trepess, Samuel J., Glencove, L. I., N. Y.
1910 Turner, Chester Bidwell, Roxbury.

1910 Underwood, Henry O., Belmont.
1901 Underwood, Loring, Belmont.

1873 Vander-Woerd, Charles, Waltham.
1899 Vaughan, William Warren, Boston.
1884 Vinal, Miss Mary L., Somerville.

1909 Wainwright, Arthur, Milton.
1849 Wakefield, E. H., Cambridge.
1876 Walcott, Henry P., M. D., Cambridge.
1895 Waldo, C. Sidney, Jamaica Plain.
1896 Walsh, Michael H., Woods Hole.
1901 Waltham, George C., Dorchester.
1907 Walton, Arthur G., Wakefield.
1902 Warburton, Chatterton, Fall River.
1912 Wardwell, Mrs. T. Otis, Haverhill.
1894 Ware, Miss Mary L., Boston.
1909 Warren, Bentley W., Boston.
1889 Watson, Benjamin M., Jamaica Plain.
1884 Watson, Thomas A., East Braintree.
1905 Webster, Edwin S., Chestnut Hill.
1905 Webster, Frank G., Boston.
1907 Webster, George H., Haverhill.
1896 Webster, Hollis, Cambridge.
1905 Webster, Laurence J., Holderness, N. H.
1909 Weeks, Andrew Gray, Marion.
1901 Welch, David, Dorchester.
1902 Welch, Edward J., Dorchester.
1884 Weld, Christopher Minot, Readville.
1899 Weld, Gen. Stephen M., Wareham.
1912 Wellington, Mrs. Arthur W., Boston.
1882 West, Mrs. Maria L., Neponset.
1887 Wheeler, Frank, Concord.
1889 Wheeler, James, Natick.
1897 Wheeler, Wilfrid, Concord.
1865 Whitcomb, William B., Medford.
1901 White, Mrs. Charles T., Boston.
1865 White, Francis A., Brookline.
1899 White, George R., Boston.
1909 White, Harry K., Milton.
1888 White, Joseph H., Brookline.
1905 Whitman, William, Brookline.
1894 Whitney, Arthur E., Winchester.
1894 Whitney, Ellerton P., Milton.
1899 Whitney, Henry M., Cohasset.
1899 Wigglesworth, George, Milton.
1863 Wilbur, George B., Boston.
1889 Wilde, Mrs. Albion D., West Roxbury.
1881 Wilder, Edward Baker, Dorchester.
1899 Williams, Miss Adelia Coffin, Roxbury.
1905 Williams, George Percy, Boston.
1899 Williams, John Davis, Boston.
1905 Williams, Mrs. J. Bertram, Cambridge.
1905 Williams, Mrs. Moses, Brookline.
1871 Williams, Philander, Taunton.
1911 Williams, Ralph B., Dover.
1881 Wilson, William Power, Boston.
1905 Winsor, Robert, Weston.
1906 Winter, Herman L., Seabrook, N. H.
1870 Wood, William K., Franklin.
1905 Woodberry, Miss E. Gertrude, North Cambridge.
1905 Woodbury, John, Canton.
1906 Woodward, Mrs. Samuel Bayard, Worcester.
1900 Wyman, Windsor H., North Abington.

ANNUAL MEMBERS.

1913 Adams, Charles F., Jamaica Plain.
1905 Allen, Mrs. Sallie R., Wilmington.
1896 Anderson, George M., Milton.

1912 Babcock, Miss Mabel Keyes, Wellesley Hills.
1911 Bacon, Augustus, Roxbury.
1865 Barker, John G., South Bend, Ind.
1898 Barr, John, South Natick.
1907 Bennett, John W., Springfield, Vt.
1893 Bigelow, Mrs. Nancy J., Southborough.
1867 Bird, John L., Dorchester.
1902 Blackmur, Paul R., Quincy.
1909 Blanchard, Herbert W., Concord.
1905 Bolton, Sabin, Hingham.
1904 Borst, Theodore F., South Framingham.
1901 Bradley, Miss Abby A., Hingham.
1913 Bradley, Miss Julia H., Roxbury.
1873 Breck, Charles H., Newton.
1902 Breed, Edward W., Clinton.
1908 Briggs, Frank P., Groton.
1909 Brigham, Mrs. Clifford, Milton.
1908 Butler, E. K., Jamaica Plain.

1910 Camus, Emil, Boston.
1904 Chandler, Alfred D., Brookline.
1903 Child, Stephen, Boston.
1890 Chubbuck, Isaac Y., Roxbury.
1910 Churchill, Charles E., Rockland.
1912 Clark, Mrs. Herbert L., Reading.
1907 Colt, Mrs. J. D., Chestnut Hill.
1881 Crosby, J. Allen, Jamaica Plain.
1875 Curtis, Joseph H., Boston.
1912 Cutler, Mrs. N. P., Newton.
1906 Cutting, Mrs. Isabelle Ladd, Roxbury.

1910 Dahl, Frederick William, Roxbury.
1889 Davis, Frederick S., West Roxbury.
1913 De La Mare, A. T., Oradell, N. J.
1911 Dolansky, Frank J., Lynn.
1897 Dorr, George B., Boston.
1884 Doyle, William E., Cambridge.

1903 Evans, Frank H., Malden.

1902 Farlow, Mrs. William G., Cambridge.
1901 Fiske, Harry E., Wollaston.
1894 Fitzgerald, Desmond, Brookline.
1885 Forbes, William H., Jamaica Plain.
1903 Freeman, Miss Harriet E., Boston.
1905 Fuld, Maurice, Philadelphia, Pa.

1912 Gage, L. Merton, Groton.
1902 Garthly, James, Fairhaven.
1912 Goodwin, Mrs. Daniel, East Greenwich, R. I.

*079
17
8t

TRANSACTIONS

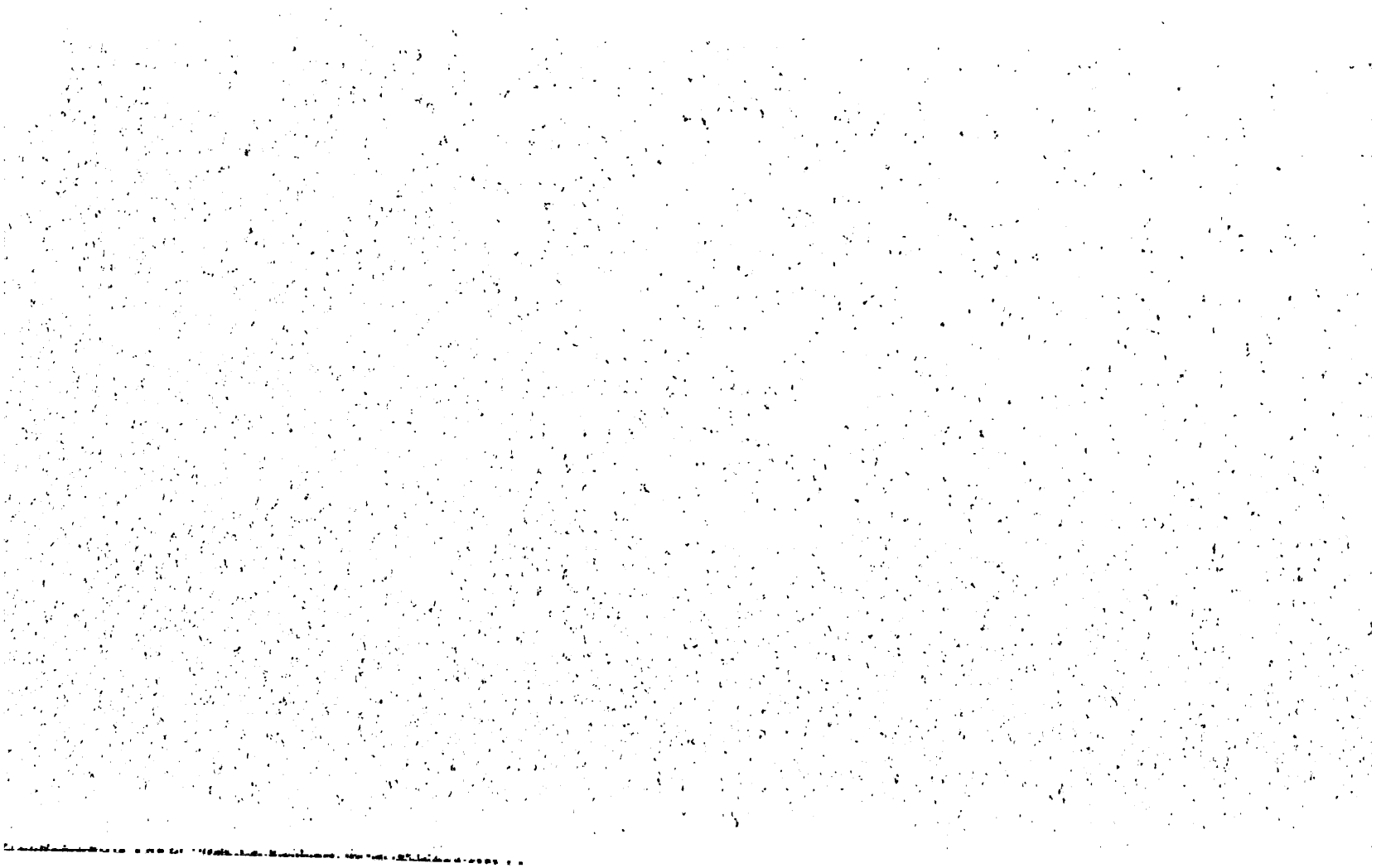
OF THE

MASSACHUSETTS HORTICULTURAL SOCIETY

FOR THE YEAR 1914

PART I

PUBLISHED BY THE SOCIETY
BOSTON
NINETEEN HUNDRED AND FOURTEEN



TRANSACTIONS

OF THE

Massachusetts Horticultural Society

FOR THE YEAR 1914

PART I

BOSTON
PRINTED FOR THE SOCIETY
NINETEEN HUNDRED AND FOURTEEN

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1914.

President.

JOHN K. M. L. FARQUHAR, of Boston

Vice-Presidents.

WALTER HUNNEWELL, of Boston.
RICHARD M. SALTONSTALL, of Chestnut Hill.

Treasurer.

WALTER HUNNEWELL, of Boston.

Secretary.

WILLIAM P. RICH, of Chelsea.*

Trustees.

THOMAS ALLEN, of Boston.
F. LOTHROP AMES, of North Easton.
ERNEST B. DANE, of Brookline.
WILLIAM DOWNS, of Chestnut Hill.
ARTHUR F. ESTABROOK, of Boston.
NATHANIEL T. KIDDER, of Milton.
CHARLES W. PARKER, of Boston.
THOMAS ROLAND, of Nahant.
CHARLES S. SARGENT, of Brookline
STEPHEN M. WELD, of Wareham.
WILFRID WHEELER, of Concord.
EDWARD B. WILDER, of Dorchester

Nominating Committee.

HERBERT A. CLARK, of Belmont.
ARTHUR H. FEWKES, of Newton
PHILIP DEXTER, of Boston
FREDERICK S. MOSELEY, of Boston.
JOHN L. SMITH, of Swampscott.

---

* Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

COMMITTEES FOR 1914.

Finance Committee.

WALTER HUNNEWELL, *Chairman.*
ARTHUR F. ESTABROOK, STEPHEN M. WELD.

Membership Committee.

JOHN K. M. L. FARQUHAR, WALTER HUNNEWELL.
RICHARD M. SALTONSTALL.

Committee on Prizes and Exhibitions.

JAMES WHEELER, *Chairman.*
DUNCAN FINLAYSON, PETER FISHER, S. J. GODDARD.
T. D. HATFIELD, DR. W. G. KENDALL,
ALEXANDER MONTGOMERY, EDWARD B. WILDER.

Committee on Plants and Flowers.

T. D. HATFIELD, *Chairman.*
ARTHUR H. FEWKES, DONALD McKENZIE,
JAMES MARLBOROUGH, WILLIAM NICHOLSON.
WILLIAM SIM.

Committee on Fruits.

EDWARD B. WILDER, *Chairman.*
WILLIAM DOWNS, HAROLD L. FROST.

Committee on Vegetables.

DUNCAN FINLAYSON, *Chairman.*
WILLIAM N. CRAIG, HENRY M. HOWARD.

Committee on Gardens.

JOHN K. M. L. FARQUHAR, *Chairman.*
ROBERT CAMERON, DAVID R. CRAIG, JACKSON T. DAWSON.
ARTHUR H. FEWKES, T. D. HATFIELD,
RICHARD HITTINGER, DR. HARRIS KENNEDY,
WILLIAM NICHOLSON, THOMAS ROLAND, CHARLES SANDER.
WILFRID WHEELER.

Committee on Library.

CHARLES S. SARGENT, *Chairman.*
RERNST B. DANE, GEORGE B. DORR, CHARLES S. MINOT.

Committee on Lectures and Publications.

WILFRID WHEELER, *Chairman.*
GEORGE B. DORR, F. C. SEARS.

Committee on Children's Gardens.

HENRY S. ADAMS, *Chairman.*
MRS. AUGUSTUS HEMENWAY, MISS MARGARET A. RAND,
HARRY S. RAND, WM. P. RICH, JAMES WHEELRR.

MASSACHUSETTS HORTICULTURAL SOCIETY.

1914.

The Transactions of the Society are issued annually in two parts under the direction of the Committee on Lectures and Publications.

Communications relating to the objects of the Society, its publications, exhibitions, and membership, may be addressed to William P. Rich, Secretary, Horticultural Hall, No. 300 Massachusetts Avenue, Boston, Massachusetts.

WILFRID WHEELER, *Chairman*
GEORGE B. DORR
F. C. SEARS
} *Committee on Lectures and Publications.*

CONTENTS.

THE INAUGURAL MEETING 7

HORTICULTURAL PAPERS AND DISCUSSIONS

Utilizing Birds in Horticulture. By *Edward H. Forbush* 13

The Hybrid Tea Rose of Today. By *George H. Peterson* 17

Soils and Fertilizers. By *Dr. H. J. Wheeler* . . . 23

Making a New Variety of Asparagus. By *J. B. Norton*. 45

Varieties of Fruits. By *Dr. J. K. Shaw* . . . 51

Orchard Sites. By *Prof. F. C. Sears* 59

Fertilizers for the Orchard. By *Henri Haskins* . . 62

Establishing an Orchard. By *R. W. Rees* . . . 69

Factors that Influence Quality in Apples. By *Dr. J. K. Shaw* 74

Some Common Orchard Pests. By *Prof. W. W. Chenoweth* 79

The Spraying Campaign. By *R. W. Rees* . . . 86

Soil Management in the Orchard. By *R. W. Rees* . 92

Some Principles of Pruning. By *Prof. W. W. Chenoweth* 95

Picking and Handling Fruit. By *Prof. F. C. Sears* . 99

Packing Apples in Boxes. By *R. W. Rees* . . . 104

Packing Apples in Barrels. By *Prof. F. C. Sears* . . 107

Can we sell our Apples? By *Prof. F. A. Waugh* . . 112

Pear Culture. By *Wilfrid Wheeler* 123

Coöperation Among Fruit Growers. By *Dr. A. E. Cance* 130

Peach Growing. By *Prof. F. A. Waugh* . . . 136

The Possibilities of Nut Culture in New England. By *Dr. William C. Deming* 141

Undesirable Foreign Plant Diseases. By *Dr. Perley Spaulding* 153

THE INAUGURAL MEETING, JANUARY 10, 1914.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

1914, PART I.

INAUGURAL MEETING.

The Inaugural Meeting of the Massachusetts Horticultural Society for the year 1914 was held at Horticultural Hall, Boston, on Saturday, January 10, at eleven o'clock, with President Farquhar in the Chair.

It was voted to dispense with the reading of the record of the preceding meeting.

President Farquhar then delivered the following inaugural address:

Inaugural Address of President Farquhar.

Members of the Massachusetts Horticultural Society; Ladies and Gentlemen: —

The expenses of the Society during the past year exceed those of the year 1912 by nearly three thousand dollars. This increase was occasioned chiefly by the necessity of installing two new boilers at a cost of over four thousand dollars to replace two worn-out sectional boilers which had previously furnished steam for heating our building. The new boilers are proving very satisfactory and economical of fuel. Another element of increase in expense is the fact of our various committees having made awards to exhibitors almost two thousand dollars in excess of the aggregate of the awards of the previous year.

The rentals of our halls have been the largest since the building was erected showing an increase of nearly fourteen hundred dollars over the preceding year. There is reason to expect this source of revenue to improve from year to year.

Receipts from admissions to exhibitions have been up to the usual amount, although about two thousand dollars less than those of 1912, when an unusually large return was derived from the Italian Garden Exhibition.

From Mount Auburn Cemetery we have received over twenty-three hundred (2300) dollars, and this revenue will probably continue without much reduction for a number of years. In time it will diminish and will cease when all the land in which we have an interest has been sold.

Under the management of your Board of Trustees many economies have been brought about, and for several years past our income has met our expenditures.

The work of the Society in promoting interest in, and spreading knowledge of horticulture, has been carried forward energetically during the past year. There never was a time when the popular interest in gardening was so evident. The attendance at our lectures last year averaged the largest on record.

Your Trustees believe that the Society should do still more in the way of teaching practical gardening, and to this end have arranged for practical demonstrations of garden work in our lecture room. They have also planned to supplement our time-honored Saturday lectures by a series of visits to places of horticultural interest in this vicinity. These excursions may be participated in by members of the Society and other interested persons, and they will be under the guidance of a competent horticulturist.

Our Society has an unusual opportunity now to give direction and guidance to the present earnest, but too often uncertain and erring efforts of our people to utilize and beautify their gardens and grounds. The teachers in our public schools, the children's gardens in the tenement districts, and suburban garden clubs are all doing good work. I wish that our financial condition would permit us to establish classes for the training of teachers for such work.

In the past the Society has devoted its energies mainly to three

lines of activity, namely, its exhibitions, its lectures, and its library work. Every feature of our work along these three lines has so often been discussed that I refrain from speaking of them now. Rather would I ask you to look afield and if possible to let our activities be even still more practical; to interest the young in the garden, to instruct their teachers so that they may be taught methods that will bring the encouragement of being successful in their efforts, to help young gardeners and florists to a better knowledge of their calling, and to help all interested in garden work to a better understanding of it, from the occupant of the city apartment limited to a window box to the owner of the large estate in the country. Let us give them such instructions in cultural methods and aid in choosing suitable subjects, that success in their efforts may be less uncertain. If we do this we shall be fulfilling the mission for which we received our Charter.

During the year on which we have entered, Boston will be the busiest city of the country in horticulture. Next August we shall have as our guests three thousand or more members and friends of the Society of American Florists and Ornamental Horticulturists attending their annual convention to be held here. This together with the growing demands of our other lines of work will keep us busy during the year.

At the conclusion of his address the President called for the usual annual reports of the officers and chairmen of the various committees which were presented in the following order:

Report of the Board of Trustees, by the Secretary.

Report of the Treasurer, Walter Hunnewell.

Report of the Secretary and Librarian.

Report of the Delegate to the State Board of Agriculture, Wilfrid Wheeler.

Report of the Committee on Prizes and Exhibitions, James Wheeler, Chairman.

Report of the Committee on Plants and Flowers, T. D. Hatfield, Chairman.

Report of the Committee on Fruits, Edward B. Wilder, Chairman.

Report of the Committee on Vegetables, Duncan Finlayson, Chairman.

Report of the Committee on Gardens, John K. M. L. Farquhar, Chairman.

Report of the Committee on Children's Gardens, H. S. Adams, Chairman.

Report of the Committee on Lectures, Wilfrid Wheeler, Chairman.

The reports were separately accepted and referred to the Committee on Lectures and Publications for printing in the Transactions of the Society.

The meeting was then dissolved.

WILLIAM P. RICH,
Secretary.

HORTICULTURAL PAPERS AND DISCUSSIONS.

UTILIZING BIRDS IN HORTICULTURE.

By Edward H. Forbush, Boston.

Read before the Society, January 3, 1914.

On account of the illness of Mr. Forbush he was unable to deliver his lecture in person, but his place was supplied by Rev. William R. Lord of Dover, Massachusetts, who read Mr. Forbush's paper as printed herewith.

Mr. Lord supplemented the paper with a highly interesting talk on the same subject, dwelling especially on the means of domesticating and increasing bird life around the home grounds, and on the important assistance of birds in keeping insect pests in check.

Mr. Forbush's paper follows:

Many people have absorbed the idea that birds were created to protect the crops from insect pests, but the relations of birds, insects, and other forms of animal life are not quite so simple as this belief would indicate. No man yet is wise enough to understand fully the marvellous relations and interdependencies existing between the various forms of animal and vegetable life, but we know that there exist between vegetation, insects, and birds what may be termed, for want of a better word, primeval economic relations, a sort of dependence one upon another; the existence of each one depending upon the existence of the others.

Birds perform the function of an aerial police force, because they are the best fitted of all the forms of animal life to concentrate quickly on any unusual irruption of insects or other lesser animals. Such an influence, working thus upon destructive or potentially destructive pests, must of necessity have a beneficent relation to agricultural industries. Birds have a marvellous capacity for destroying pests. They are wonderfully active and tremendously energetic and the resultant great and constant wasting of the tissues calls for exceedingly rapid renewal. Constant fuel is required to keep the vital fires brightly burning. Hence, birds require an enormous quantity of food.

The late Chester A. Reed, author of "Bird Guide," regarded one hundred insects as the average number eaten by each individual insectivorous bird daily. He estimated by an ingenious calculation that two billion five hundred and sixty million (2,560,000,000) insects or twenty-one thousand (21,000) bushels are eaten daily by the birds of Massachusetts. I believe it was Professor Lawrence Bruner who estimated that the birds of Nebraska, a much larger State, ate one hundred and seventy carloads in a day. When we consider that a very large proportion of the insects are injurious, or would become injurious, to crops or trees if not held in check, we can see the advantage of increasing and fostering bird life. We may even reduce some of these benefits to the common standard of dollars and cents.

I hold in my hand a document, containing a message of the President to Congress, transmitting a report of the biological survey of the Department of Agriculture, in which it is stated that a single species of hawk saves the farmers $175,000 yearly by destroying grasshoppers and field mice; and that the native sparrows of the United States save to the agriculturists $35,000,000 yearly by destroying weed seeds. Professor F. E. L. Beal of the Department of Agriculture has made a careful study which seems to show that each pair of meadow larks is worth at least $4 a year to the farmer, because of the grass they save by the destruction of insect pests. A friend in Bristol County, having carefully studied the work of the bob-white or quail, is satisfied that each pair on his farm is worth $5 a year to him, because of the potato beetles and other insects they destroy.

Birds are of greater potential value in the field and forest than in orchard or garden. Insecticides and other means may be used to control certain pests, but we cannot drench with poisonous sprays the grass which horses and cattle eat, nor can we spray all the trees in all the woods. We are absolutely dependent on the birds and other natural enemies of insects to protect the trees and the grass crops of the country from insect pests. Wherever birds exist in normal numbers, they perform their office well except where some foreign pest has been introduced which they are not accustomed to.

Something, however, may be done to utilize birds in horticulture and fruit growing, for there are many injurious insects that cannot

be reached by arsenical spraying. Some which are readily destroyed by birds cannot be controlled by any practicable mechanical means now known. Birds, if attracted to an orchard in numbers, are very destructive to the principal leaf-eating insects, such as the tent caterpillar and the canker worms, the codling moth, and, in less degree, to the gypsy and the brown-tail moth which our birds do not yet fully understand, although about fifty species are known to feed on one or both. Such insects can be controlled by spraying, but there are many insects which feed under the bark or in the wood, destroying the tree, which cannot be reached by spraying; for example, the introduced leopard moth. Fruit growers know how dangerous a pest it is, but there is little fear that there will be any great loss from this insect in the country at large, provided we are able to foster and increase the stock of native insectivorous birds.

Woodpeckers destroy quantities of borers, thus saving many trees. There is at least one instance on record where nuthatches saved orchardists thousands of dollars by destroying the pear tree psylla which is not affected by poison sprays. Owls are among the most beneficial of all birds because they destroy mice and nocturnal insects, particularly field mice, which are very destructive to trees and crops. All European writers who have observed the habits of the owls agree that they are wonderfully useful in this respect. Our larger species, such as the great horned owl and the barred owl, sometimes molest poultry and game, but the smaller species almost never pursue fowls or pigeons except when driven by stress of weather and starvation. The screech owl may often be induced to make its home on a farm by putting up a nesting box for its accommodation. A box twelve inches square and fifteen inches high with an entrance near the top four inches by five would be ample for a family of screech owls, and such a box as this was chosen by a pair of these owls near my orchard. In this they reared their young and while there destroyed all the mice about the place.

In conserving small birds, it is well, so far as possible, to secure the services of their natural protectors. Kingbirds, while quarrelsome, act as protectors to other small birds by driving away crows and hawks. Kingbirds may often be induced to nest in the orchard by hanging on branches or fences a plentiful supply of cotton

string cut in lengths of one foot. This sometimes will induce orioles to nest. Martins also drive away hawks.

Some few experiments have been made with birds in greenhouses by introducing them there as protectors of the plants. In one such case, some juncos and tree sparrows, shut in a greenhouse in the fall and kept there during the winter, absolutely destroyed a pest of plant lice. Hummingbirds are serviceable among flowering plants, not only because, like the bees, they distribute pollen, but also for the reason that they feed on many of the minute insects of the plants and flowers, some of which may be too small to escape the notice of other birds. Hummers may be readily attracted by planting bee palm, honeysuckle, or almost any deep, bell-shaped flower.

THE HYBRID TEA ROSE OF TODAY.

By George H. Peterson, Fair Lawn, N. J.

Delivered before the Society, January 17, 1914.

From time immemorial, the rose has been the favored flower of mankind, and today its hold upon our hearts is stronger than ever. It was not so very long ago that the hybrid tea rose was practically unknown, and in those days, in this country, we could enjoy roses out-of-doors practically only in June, with the exception of the more or less tender teas, which needed much care. Because of this many people became discouraged in their attempts at roses. The bulk of their plants gave flowers only in June, and often the rose-bug got more of the flowers than did the grower. With the advent of the hybrid tea, however, outdoor rose-growing has greatly changed, and now one may have an abundance of the most glorious roses imaginable from June to October. Fortunately, the rose-bug or rose-chafer is not with us after June, and in autumn one can have hybrid tea roses in his garden of even finer quality than in June, as then we have the moister weather and less hot sun, and the rose delights in a damp atmosphere.

As the name of this class of roses indicates, they are originated by the crossing or hybridizing of a tea rose with another class; or, at least, this was the original method when the hybrid tea first appeared. At that time the strong-growing and hardy hybrid perpetual or remontant rose was used in crossing with the tea. Hybridizing the tea rose with the hybrid perpetual, the constant blooming qualities of the former were retained, and in addition to which we secured, in a large measure, the size and vigor of the hybrid perpetual class as well. Of recent years other classes of roses have been used; for instance, the yellow briers, and this has given us what was formerly lacking in the hybrid tea class — magnificent shades of yellow.

Strictly speaking, the hybrid tea made its advent nearly a half century ago, but of the efforts at that time practically only one

variety is left us, viz., La France, a rose which is still favored because of its almost unequalled fragrance. At first, this variety was generally classed as a hybrid perpetual, and some of the Holland growers class it as such even to this day, but there is no question as to the proper class in which it should be placed.

There seems to have been little done in that way until about twenty years later, when Bennett sent out some varieties, two of which, both blush varieties, Grace Darling and Viscountess Folkestone, are still quite largely grown. In 1891 Lambert & Reiter, a German firm, sent out Kaiserin Augusta Victoria, a lemon-white rose, which to this day in its color has not been surpassed. Unfortunately this variety is not so strong a grower as many or most of the hybrid tea class, but in quality of flower nothing more could be asked for or sought.

About fifteen to twenty years ago two European growers took up the development of the hybrid tea in earnest; I refer to Alexander Dickson & Sons in Ireland and J. Pernet-Ducher in France, and up to this time these two firms have probably sent out more new, fine varieties of hybrid teas than all other raisers combined. During the past five or six years, however, McGredy & Son of Ireland have been sending out some uncommonly fine sorts, and if they keep on as they have been doing I predict that they will soon carry away the laurels.

At the present time new varieties are coming so thick and fast that it is practically impossible to keep track of them all. Of course many of these will not stand the test of time, and as we already have so many known good varieties I would advise the average planter to confine himself very largely to the tried-out sorts. The hybrid tea rose is particularly strong in the various shades of pink, and of recent years various shades of yellow and red have become abundant, but in white we are less fortunate.

In any given list there must be some varieties omitted, which succeed in some soils and climates, and in the following abbreviated list I shall endeavor to give only such as are most generally successful under the most varying conditions and covering a wide extent of country.

Pink — Belle Siebrecht, Dean Hole, Jonkheer J. L. Mock, Killarney, Lady Alice Stanley, Lady Ashtown, La France, Lyon-

Rose, Madame Caroline Testout, Madame Jules Grolez, Madame Segond Weber, Marquise de Ganay, My Maryland, Radiance.

Red — Chateau de Clos Vougeot, Etoile de France, General McArthur, Gruss an Teplitz, Laurent Carle, Richmond.

Yellow — Duchess of Wellington, Madame Ravary, Marquise de Sinety, Mrs. Aaron Ward, Mrs. A. R. Waddell, Sunburst.

White and Blush — Bessie Brown, Florence Pemberton, Kaiserin Augusta Victoria, Pharisaer, Souvenir du President Carnot, White Killarney.

In addition to the above, several of the newer varieties will no doubt be found equally desirable as soon as they are thoroughly tested out.

We have so far been considering the hybrid tea from an outdoor-growing standpoint, but there is another phase of rose-growing which, while it appeals to few directly, interests us all more or less, since in this country the commercial growing of roses, under glass, has become an important industry. Most of us are not so fortunate as to be able to own and maintain a greenhouse, and so to have roses when they cannot be grown out-of-doors we must purchase them; and while we are considering the hybrid tea rose it is at least interesting to know that practically all roses grown commercially under glass today are hybrid teas. Those most largely so grown are as follows: Killarney, White Killarney, Richmond, Radiance, My Maryland, Mrs. Aaron Ward, Sunburst, Mrs. George Shawyer.

While on this side of the Atlantic less attention has been paid to the raising of new varieties, yet a few very good ones have originated here, and as a rule the hybridizer in America strives for a forcing rose. In this way we have Richmond, which for several years has been the leading red forcing variety. This was originated by Hill of Indiana, who has also given us General McArthur, probably the best all-around red, for outdoor purposes, grown today. Cook of Baltimore must be given credit for sending out both Radiance and My Maryland, both of splendid forcing varieties and outdoor roses as well. In fact, I consider Radiance, weighing all its points, one of the very best hybrid teas for the amateur to plant.

Now the question arises, What shall we do to enjoy the hybrid tea rose continuously during summer and fall? In the first place,

a site for the planting should be selected well away from trees or shrubbery, and at least a few feet away from buildings. The bed, for best results, should be well in the open where it will get sun for at least half the day, and yet be somewhat sheltered from the wind of fiercest storms. The bed or beds should have at least fifteen to eighteen inches of good rich soil, well manured, including an application of bone, all of which should be thoroughly mixed through the soil, and not left in layers. Any good garden soil can be made to grow very fine hybrid tea roses, but remember that the rose delights in a rich, moist soil, so if there is some clay in it, so much the better. The careful grower may plant his roses in the fall, but the average planter in New England will find early spring, before deciduous growth begins, the best time; and the earlier this planting is done, the better will be the first crop of blooms, which should follow in about two months from time of planting. In order to receive one's plants on time and to get the best, the order should be placed with your grower weeks or even months in advance. In handling the plants after arrival care should be taken to expose the roots to the air as little as possible, i. e., in case of dry, clear weather. Do not crowd and double up the roots into a small hole, but spread them out naturally, and when the roots are covered, tread the ground firmly about each plant with the foot. After setting, the plant should be pruned severely, leaving the canes only from three to six inches long, according to strength, the weaker shoots being pruned closest. If planting is done early, while the ground is still moist, little or no watering will be required until the plants begin to leaf out. From that time on, however, frequent waterings should be given during dry spells of weather, since the rose, as mentioned before, delights in moisture.

Each new strong shoot will produce usually three or four buds, all of which, except the terminal one, should be pinched off as soon as they can be taken hold of; and if this is done, one can have glorious roses beginning the first June after planting.

As we all know, the rose has its peculiar diseases and insect foes, but in this day of bugs and blight what plant has not? As the shoots appear there will often be found upon the tender ends of same a number of little green, lice-like insects called aphis.

These do not eat the plant, but live by suction, and while, consequently, they cannot be successfully poisoned, yet they can be killed by contact. The fumes of tobacco are fatal to this insect, and out-of-doors this is best applied in the form of tobacco water or fresh tobacco dust sprinkled upon the plants and which will cause no injury to the latter, even though heavily applied.

A little later green worms will appear on the foliage. These can be destroyed by using freshly powdered white hellebore, which is also harmless to the plant. In June the rose chafer, or rose bug, makes its appearance — a brownish, hard-shell, flying insect, the worst sinner of them all. Hand-picking into a little pan of kerosene is the most effective way of destroying this insect, since he does not appear until the flowers are open and anything strong enough to kill him would ruin the petals on which he feeds.

Two of the chief diseases to which the rose is subject are mildew and blackspot. These, however, can be controlled by spraying with sulphide of potassium and Bordeaux mixture. I would recommend each grower to possess a good general work on rose culture.

While there are some difficulties in the way, yet these are often largely magnified, since if one has fairly good soil and strong, vigorous plants to start with, little trouble need be experienced. Insect foes and diseases always prey chiefly upon the weak, both in plant and animal life. With a little earnest effort one can today be rewarded with an abundance of roses in his garden, often equalling the finest product which the commercial grower can turn out under glass, and that this can be so enjoyed we have to thank those who by patient effort, and through many discouragements, have wrought so wonderfully in the development of the hybrid tea rose of today.

SOILS AND FERTILIZERS.

By H. J. Wheeler, Ph. D., D. Sc., Boston.

Delivered before the Society, January 31, 1914.

The first and greatest function of soil is to serve as a place of anchorage and support for plants. Some of the lower plants, to be sure, have no need of such anchorage and in water and soil are subject to free movement without injury. On the other hand, certain seaweeds, though existing in the water, are dependent upon maintaining an anchorage. The anchor, or "hold-fast," in some instances reaches a diameter of three feet and a single plant extends itself to a length of from 700 to 1,500 feet.

Plants are affected by moisture, heat, air, light, bacteria, and by other low forms of plant and animal life which are regular denizens of the soil. These may have either a beneficial or injurious effect according to the kind.

It is true that soils furnish naturally to the plant varying amounts of mineral matter, which are either absolutely essential, or under certain circumstances, incidentally helpful.

The mineral matter and the countless living plant and animal inhabitants of the soil must be supplemented by dead and decaying remains of plants and animals, if the soil is to serve as the most useful medium for the growth of agricultural plants.

From the standpoint of the geologist, all soil is called "rock" for he can never find a positive dividing line between the two. The question is often asked at agricultural meetings, "Do rocks grow?" From the standpoint of the agriculturist the more or less solid matter which we call rock is continually weathering and crumbling to a form which we recognize as soil, whereas in other places sand dunes, gravels, and lacustrine and ocean sediments are being compacted by the pressure of overlying accumulations and are being cemented into solid masses of sandstones, conglomerates, shales, slates, or limestone, by carbonate of lime, iron compounds, and by soluble compounds of silica.

It is one of the wonderful provisions of an all-wise Providence that changes of temperature, thawing and freezing, wind action, water wearing, bacterial and other higher plants, as well as earthworms and burrowing animals, all play an effective part in reducing surface rock to soil, so that it may form a suitable habitat for miscellaneous forms of plant life.

The Life of the Soil.

The types of bacteria, fungi, protozoa (microscopic animals) and other useful or injurious forms of living organisms in the soil are affected by the kinds, amounts, and relations of the mineral and dead organic matter present, and also even by the chemical reaction of the soil mass.

The amount of organic matter added to the soil, directly, by the growth of the lower plant organisms, and the quantity of nitrogen fixed by them directly from the air, are dependent upon the temperature, moisture, and the kind and volume of available mineral matter.

The rate of decay of vegetable matter, and hence the character and volume of humus in soils is influenced greatly by the temperature, moisture, porosity, and chemical soil reaction.

The soil is no longer looked upon as a lifeless and inert mixture of minerals and organic substances, but rather as a mass ever in motion and teeming with countless millions of living organisms of various kinds, engaged in a continuous battle for supremacy, and as a result of the stage of that battle, exerting a marked influence for good or ill on the growth of agricultural plants.

Formerly the sole or chief function of animal manures was supposed to be the addition of plant food and of humus whereby the moisture content of the soil and its ability to retain fertilizers were greatly increased. Now, however, it is known that a gram, or about a twenty-ninth of an ounce, of either cow or horse dung contains from 60,000,000 to 150,000,000 microörganisms, and in human feces, as many as 18,000,000,000; in fact J. Strasburger found that from 17 to 68% of the entire mass of human excrement consists of these organisms. From this it will be seen that farmyard manures may perform a highly important function, especially

on old grass sward, for by introducing large numbers of certain kinds of these organisms and by creating an alkaline condition in the soil, the process of decay is hastened and the humification and nitrification of the accumulated vegetable matter is greatly facilitated.

Nitrogen Assimilation From the Air by Legumes.

Time will not permit of the discussion of the various views and contentions of Liebig, Boussingault, Ville, Lawes and Gilbert, and other earlier investigators and writers, who contended as to the relative importance of mineral and nitrogenous manures and also as to the manner in which nitrogen was assimilated by plants. It should be noted, however, that the work by Atwater on the assimilation of nitrogen by legumes, in 1884, supported the earlier results by Ville. This was then supplemented by the splendid work of that modest, careful German investigator, Hellriegel (1880–1888) by which the relation of microörganisms to nitrogen assimilation was definitely established, thus bringing about a new epoch in our knowledge of plants and their economic production.

Concerning Toxic Substances in Soils.

Another controversy has been developed more recently by certain assertions of Whitney and his co-workers. He at first claimed that the chief function of commercial fertilizers was not the furnishing of food to plants, but rather the improving of the physical condition of soils. Later, this position was very largely abandoned. It was subsequently claimed by the Bureau of Soils in Washington, D. C., that practically all minerals of agricultural importance are present in all soils; that there is no practical difference in the composition and concentration of different soil solutions; that the soil solution is being continually renewed by solution of the minerals; and that plants were able to draw their nutriment from very dilute solutions. From this the conclusion was obvious that fertilizers were not needed to furnish plant food, but if they were helpful, it must be by virtue of performing other functions.

It had already been claimed in 1832 by De Candolle that plants

excreted from their roots substances poisonous to themselves or to other plants which follow them.

Early in the preceding century Mulder in Holland, Voelocker in England, as well as other French and German investigators, had pointed out that soils often contain certain salts of iron, and other compounds which are frequently poisonous to plants.

Attention was called in 1892 and 1893 by the work at the Rhode Island Agricultural Experiment Station, to the fact that when carbonate of lime was deficient in soils, poisonous substances were present. This was found to be true even of unfertilized and unmanured lands, including well-drained uplands. Seven or eight years later, it was found that similar conditions had developed at the agricultural experiment station at Woburn, England, where mixtures of ammonium chlorid and ammonium sulphate had been used as fertilizers for a long series of years. When this soil was leached with water, and the leachings were added to other soils, they were found to affect plant growth injuriously.

Fertilizers not Merely Anti-Toxins.

The foregoing considerations probably furnished the foundation for still another theory which shortly emanated from the Bureau of Soils in Washington, D. C., to the effect that the function of fertilizers was to act as anti-toxins, or, expressed in another way, it was to transform and put out of action these various poisonous substances, whether produced as the result of vegetable decay, or formed as root excretions.

The most interesting feature of this theory was that from the complete fertilizer standpoint, it rendered necessary the assumption of three distinct types of plant poisons: one of which was to be destroyed or rendered innocuous in varying degrees by all phosphatic fertilizers; another by any one of the potash salts, whether chlorid, sulphate, silicate, carbonate or nitrate; and a third rendered innocuous by nitrogenous compounds regardless of whether they were ammonium salts, nitrates, blood, tankage, fish, calcium nitrate or calcium cyanamid. Finally, in view of the fact that before liming, certain soils were toxic to plants, even after the three so-called

essential elements were applied, it was obvious that there was still a fourth type of toxic substance which could be rendered innocuous only by the use of lime. It is but fair to the Bureau of Soils to state that this view as it relates to the function of nitrogenous fertilizers was soon recognized as untenable.

The promulgation of some of these ideas, which are to a large degree at variance with authorities throughout the world, has had the unfortunate effect of strengthening a strong prejudice against fertilizers in certain parts of the Middle West, which certain advocates of raw rock phosphate have fostered. This it will take some time to overcome, and in the meantime, the crop yields per acre in that section of the country may be expected to decrease still further, whereas, those of the eastern sections of the country, where fertilizers are used, are rising more nearly in accord with, or even equal to, those of Europe.

The most unfortunate feature of this whole matter has been the dissemination of these ideas among farmers, as a basis for agricultural practice, whereas had the matter gone no further than a discussion among scientists, no practical injury to agriculture would have resulted.

Mineral Fertilizers Lasting in Their Effects.

In addition to the foregoing, the public has been informed that the action of fertilizers, if they chance to be used in excess, is fleeting, and that little or no subsequent benefit will be observed.

In view of the foregoing, it is of interest to note that soils at Rothamsted, England, on which either phosphatic fertilizer or potash salts had been used, produced far better crops than where they were omitted. The watery solutions of both of these soils nourished plants far better and were respectively richer in phosphates and potash than solutions prepared from soils which had received neither phosphates nor potassium salts. Upon treating these soils with weak and strong acids, it was found that those to which phosphates had been applied, yielded extracts containing about five times as much phosphate as the soil on which no phosphate had been used. Similarly the soils where potash salts had

been applied in the past yielded extracts about eight times richer in potash than those to which no potash had been added.

This shows that the acid solutions of the soils, like the watery solutions, vary in concentration, and that the concentration was greater where phosphatic and potassic fertilizers were used in the past than where they were not. Furthermore, the soils yielding the richer watery extracts were in all cases the more productive, and the fact of the long existence of beneficial after-effects from the use of phosphates and potash is splendidly illustrated.

In connection with the foregoing investigations, Hall (formerly Director of the Rothamsted Experimental Station) and his co-workers also prepared watery extracts of two other soils, one where wheat and the other where barley had been grown for sixty years in succession. It was found that both wheat and barley grew better in the extracts from the barley soil than in those prepared from the wheat soil, and in both cases, the growth was slightly better than in an artificial solution of mineral substances having the same chemical composition. The solutions from the barley soil were also richer in mineral matter than those from the wheat soil. According to Hall, these several results show conclusively that there was no accumulation of toxic root excreta, nor indeed, of a toxic substance of any sort in these soils which had in each case been devoted to a single crop for sixty years.

In summarizing this work, Hall expresses himself as follows:

"(1) The composition of the natural soil solution as regards phosphoric acid and potash is not constant, but varies significantly in accord with the composition of the soil and its past manurial history.

"(2) Within wide limits the rate of growth of a plant varies with the concentration of the nutritive solution, irrespective of the total amount of plant food available.

"(3) When other conditions, such as the supply of nitrogen, water, and air, are equal, the growth of the crop will be determined by the concentration of the soil solution in phosphoric acid and potash which, in its turn, is determined by the amount of these substances in the soil, their state of combination, and the fertiliser supplied.

"(4) On normal cultivated soils the growth of crops like wheat and barley, even when repeated for 60 years in succession, does not leave behind in the soil specific toxic substances which have an injurious effect upon the growth of the same or other plants in that soil.

"The net result of these investigations is to restore the earlier theory of the direct nutrition of the plant by fertilisers. The composition of the soil

solution which determines the growth of the plant is dependent upon the amount and the mode of combination of the phosphoric acid and potash in the soil, both of which are affected by the fertiliser supply, though to what extent is not yet determinable."

Another case where the accumulation of toxic root excreta would seem to be impossible is that of lawns, for it is a well-known fact that some of the best lawns in England are said to be several centuries old. It is, therefore, obvious, that permanent lawns of this character would be an impossibility if the grass were excreting poisonous substances which were capable of accumulation in the soil.

Effect of Crops Upon Those which Follow.

In view of what has been presented, it may be of interest at this point to mention an experiment which was conducted by the writer and S. C. Damon at the Rhode Island Experiment Station. A large number of plots of land were tested as to their uniformity without fertilization, first for one year by growing Indian corn, and then a second year by growing across each, strips of a large number of different kinds of plants, with which it was proposed to experiment subsequently.

As a result the plots were found to be as uniform for all of the plants as could reasonably be expected. Each plot was then devoted for two years to a given crop, and all were moderately fertilized with a like quantity of a complete fertilizer of the same kind. The third year onions were sown over the entire area represented by each of the plots. It was noted almost from the outset that the onion plants on the plots of land which were devoted the previous year to cabbage, mangel wurzels, Swedish turnips, and buckwheat, were behind the others. Next followed the onions which succeeded potatoes, whereas, the best results of all followed redtop. When the onions were about 1½ to 3 inches tall, a frost occurred, but no injury resulted excepting on the plots where the growth had been somewhat inferior from the outset. The line of demarcation was also absolutely in accord with the outline of the plots showing that it was not due to faulty air drainage over a portion of the area, for had such been the case, the

boundaries between the injured and uninjured portions would naturally have been somewhat irregular and they would not have followed for more than 200 feet the exact border of the plots, which were located side by side. As the season advanced, the differences became more and more accentuated until finally, at the close of the season, it was found that the onions following the cabbage, mangel wurzels, Swedish turnips, and buckwheat, were small, had thick necks, and failed to ripen properly. Where redtop had preceded for two years, a large crop was produced and the growth and ripening were normal. The results following the other crops ranged between these two extremes. In other words, the yield of No. 1 onions ranged from between 12 and 13 bushels to the acre where the results were bad, to 412 bushels on the redtop plot. For the fourth and fifth years of the experiment, each plot was devoted to the same crop which had occupied it during the first and second years, and the sixth year, 1913, when the work was in charge of Director B. L. Hartwell, buckwheat was sown over all the plots, though, for the first time in six years, all fertilizer was omitted.

It was found, as a result, that the buckwheat grew better on some of those plots where the conditions were disastrous to onions, than it did on the others, and best of all following Swedish turnips. It will be seen from this that there was apparently a peculiar effect upon the physical condition of the soil, upon its bacteriological condition, and its microscopic animal life, or, the result may have been due to excretions, to great differences in the demands of preceding plants upon the various constituents of the soil, or to other obscure and hidden influences.

Fertilizers in their Relations to Crops and Soils.

Much evidence has already been secured to show that fertilizers should be prepared differently according to the crop which has preceded and that which follows. The whole solution of this problem, however, has not been reached, yet the manufacture of fertilizers designed to meet the needs of special crops and soils is being continually placed on a more scientific basis.

In many of the claims which have been put forth by the Bureau of Soils there exist certain elements of truth; and it is because of this seductive fact that they have received exaggerated attention in those parts of the country where fertilizers are but just being introduced. It is quite true, for example, that certain fertilizers do destroy toxic substances in the soil, whereas others may lead to their creation. For example, in the case of very acid soils, the long continued use of large amounts of nitrate of soda tends gradually to lessen their acidity and the quantity of toxic substances which often accompanies a lack of lime. On the same kind of a soil ammonium chlorid or sulphate of ammonia would gradually increase the toxicity by virtue of leaving acid residues behind, instead of sodium carbonate, as in the former case.

There are, however, other factors to be considered, for certain phosphates are rendered more available in the soil if sulphate of ammonia is used as the source of nitrogen than when nitrate of soda is employed. On the other hand, still another kind of phosphate would be likely to be made more available by the nitrate of soda. Sulphate of ammonia is also said to be better than lime for correcting the unfavorable conditions created by nitrate of soda in heavy clay and silt soils.

Again, on a very acid soil, calcium chlorid may be highly toxic; sulphate of lime (land plaster or gypsum) may not correct the condition more than slightly, if at all; whereas the character of the productiveness of the soil may be wonderfully increased by the application of burned or slaked lime, or by any form of carbonate of lime.

Some Points Concerning the Effects of Lime.

It has long been noted that soils which are even quite lacking in carbonate of lime nevertheless contain rather surprising amounts of nitrates. In a study of a Rhode Island acid soil, it was found that nitrates were present, and that the difference in the activity of the nitrifying organisms before and after the application of lime was not great enough to more than partially explain the remarkable benefit which followed its use.

A most interesting and suggestive investigation has just been made by Abbott, Conner, and Smalley (Bulletin No. 170) of the Indiana Agricultural Experiment Station which promises to shed new light on some of these questions and to offer another reason why liming is often helpful. They found soils which were relatively unproductive even after the introduction of organic matter and after the application of ample fertilizer. The extracts of these soils were adequately rich in nitrates, but the nitric acid was found to be present very largely in combination with alumina which, in the absence of enough lime and magnesia, had been seized upon for use as a base by the nitric acid. The latter, as is well known, must combine with some basic substance such as soda, potash, lime, or magnesia, or it soon collects to such an extent as to inhibit further nitrification. Experiments with plants grown in watery solutions showed that the aluminum nitrate was poisonous to plants, whereas the same amount of nitric acid in other combinations was highly beneficial. It was found, upon liming, that the nitric acid united with the lime forming nitrate of lime, the alumina was thrown out of solution, and the soils became highly productive.

At this point, attention should be called to the fact that substances which are so poisonous to certain plants as to cause them to die to the last individual may nevertheless fail to injure other plants and may even sometimes be helpful to them. This is well brought out by the fact that where a soil was so greatly in need of lime as to absolutely prevent the growth of a crop of clover, timothy, cantaloupes, onions, lettuce, beets, spinach, and cress, it would nevertheless produce splendid results with blackberries, common sorrel, serradella, watermelons, cranberries, and *Silene orientalis*.

From what has just been said, the futility of carrying on laboratory tests with wheat seedlings, as has been done in some cases, as a basis for conclusions concerning the need of lime for miscellaneous agricultural plants, must be obvious; and no one should attempt in any case to predict from the results secured with any given agricultural plant as to what may be expected with others.

It is an interesting fact that on an acid soil where the bush lima bean will thrive to perfection, the pole horticultural beans will fall slightly short of a maximum crop, and the golden wax or Low's

Champion (a green-podded string-bean) will produce hardly more than half a crop.

At this point, attention should be called to a common error of agricultural writers, for many of them still assume that all of the legumes are greatly helped by liming on soils of great or even of moderate acidity. In this regard the lupines vary as widely among themselves as the beans which have just been mentioned. It is also a well recognized fact in Europe that serradella is often injured by liming; the soy bean, and more particularly the cowpea, may be injured the first season by heavy applications of slaked lime, though responding favorably to it after the lapse of a year or two. Even the clovers are not extreme in their need of lime for they will thrive well, where further liming is needed in order to secure maximum crops of winter vetch and particularly of alfalfa.

The Cuthbert raspberry responds moderately to liming where the closely related black-cap raspberry and the blackberry are indifferent to it.

The American elm, American linden, quince, cherry, and plum, respond well to liming, where but small benefit is noted with the Baldwin apple, little, if any, with the Bartlett pear or sugar maple, none with the common white birch, and where positive injury results to the average spruce and pine and probably to the kalmia, rhododendron, and azalea.

In view of these wide variations in plants, which constitute but a part of the 600 or more varieties which the writer has tested, he may perhaps be pardoned for suggesting that no one is justified in discussing the effect of soil acidity and of its accompanying conditions upon plants in general, as a result of conclusions drawn from one or even from several varieties.

Fertilizers not Stimulants in a Bad Sense.

Recently certain public speakers and agricultural writers in the United States have been designating fertilizers as "stimulants" and at the same time have been advising that all that it is necessary to purchase for the fertilization of soils is raw rock phosphate and ground limestone.

Whatever the intent of these speakers and writers, there can be no question as to the interpretation placed upon such statements by the general public. Every one is familiar with the designation of alcohol as a stimulant, and the inevitable consequence of such statements is that the public is led to believe that whatever effect fertilizers may have, it is merely temporary, and that the final result of their use will be bad. According to Webster's Dictionary, a stimulant is something "producing increased vital action in the organism at any of its parts." According to such a definition each one of the elements essential to plant growth is a stimulant and without stimulants plant growth and reproduction would be an impossibility.

The popular idea regarding fertilizers, however, as formed from such statements as those to which reference has been made, is that they are of mere temporary benefit, and there is no suggestion or implication of the actual fact that their constituents enter into and form an essential part of the plant itself, without which its existence would be impossible.

Nitrate of soda is the ingredient of fertilizers which is most frequently mentioned as a stimulant in the improper sense, that is, as something having merely a temporary effect; whereas, on the contrary, the nitric acid enters into the plant, and the nitrogen thereof is an absolutely essential constituent of the protoplasm, without which plant growth and reproduction could not take place.

Iron, lime, magnesia, and sulphur, might, with equal propriety, be called stimulants, and yet plants cannot thrive and develop seed without them. A striking illustration of this is afforded by attempting to grow Indian corn in a medium free from iron, for the plants soon take on a chlorotic or yellow appearance and growth practically ceases. If, however, a small amount of iron chlorid is added to the medium in which the plant is being grown, an entire transformation takes place within a few hours, the leaves become green, vigorous growth follows, and the plant goes forward functioning in a perfectly normal manner. The designation as "stimulants" of materials like these without which no plant reproduction is possible is positively vicious and misleading. This is, therefore, an attempt to create popular prejudice against those very fertilizers, which are known to have been the chief factor in raising the yield

of wheat in Europe from 4–6 bushels to 31–32 bushels to the acre, and which are now rapidly and profitably raising the yields of Indian corn in the East far above those of the Middle West.

Raw Rock Phosphate.

Recently New England has been invaded by certain speakers from the Middle West who have asserted, with but little qualification, that no other form of fertilizer or phosphate is necessary on the New England soils than ground limestone and raw rock phosphate. In support of this view results are cited from the black, acid, corn belt of Illinois, where the soil conditions are utterly different from most of those which exist in New England, and where the possibility of the economical application of raw phosphate rock is far greater than on practically any of our New England soils, excepting those known as peat, muck, or, possibly black, rich and acid river bottoms.

Last winter in Connecticut a speaker cited the Ohio and the Tennessee Experiment Stations as having secured results supporting those which had been quoted from the black, corn-belt soil of Illinois. My recollection of the phosphate experiments in Ohio was to the effect that little or no financial advantage had been shown from the use of raw rock phosphate as compared with superphosphate (acid phosphate). Previous to this Connecticut meeting, I had written to the Director of the Ohio Station, asking him for the latest word on this point. A reply was received from Director Charles E. Thorne under date of December 13, 1912, in which he states:

> "The only point upon which an issue could be taken is, as to whether the raw rock is a more economical reënforcement to manure than acid phosphate. On this point we are in doubt. Apparently, in our experiments acid phosphate is somewhat more effective in proportion to cost, than the raw rock, but there is room for argument on this point."

When the speaker in Connecticut quoted the Ohio Station as having so strongly supported the view which he was presenting, I referred to this letter, saying it was from one of the stations cited,

but without at the time mentioning the station or the name of the Director from whom it was received, for I had then no authority to make public use of it, although this was subsequently granted. The speaker was asked how he would explain the fact that his conclusions from some of these experiments were so widely at variance with those of the Director of at least one of the Stations which he had cited. In reply he stated to the audience of about 250 people that I was now connected with a fertilizer company. The intimation was that because of this fact my statement could not be accepted, and my possession of the letter was also practically questioned by one of the audience. Such an intimation in the place of a frank and open statement of the reason for drawing such different conclusions from the results, than had been drawn by the Director of the Station cited, was a great surprise, coming as it did from a college professor who should stand for fair dealing and the truth at whatever cost.

Upon my return from that meeting I wrote to the Tennessee Agricultural Experiment Station stating that their results had been quoted as supporting the greater economic value of raw rock phosphate as compared with superphosphate. I asked if such were the case, and if so, if they would kindly send me the bulletins and reports in which these results were outlined. In reply I received a letter containing the following statement:

"I am sure that I do not understand how Dr. * * * has been lead to believe that our results show floats to be a more economical source of phosphoric acid for plants than acid phosphate. For my views in the matter I refer you to Bulletin No. 90, pages 86–90."

It is needless to say that I forthwith wrote to the Tennessee Station for a copy of bulletin No. 90, and also asked permission to use in a public way the letter which has just been quoted. The following quotations from bulletin No. 90 of the Tennessee Station will be of interest at this point:

"The results obtained here, however, demonstrate that under liming, which should be considered necessary, acid phosphate would without doubt be a more profitable material than phosphate rock. . . . There seems, therefore, to be little promise in phosphate rock on soils like those under

consideration, unless liming be omitted, and even then the results of Series III and IV show that acid phosphate may be much more profitable than the untreated rock."

Particular attention should be directed to the fact that certain crops very largely failed on this soil in Tennessee unless lime was used, a fact for which I can vouch from a personal inspection of the crops in the field. The absurdity of attempting to maintain these lands in an acid condition in order that they may render phosphate rock more quickly and fully available, when by doing so the effect upon many of the important crops of the State would be most serious, must be too obvious to require comment.

At the same meeting in Connecticut, to which reference has been made, certain results secured at the Rhode Island Station, were quoted by the speaker from the Middle West in support of raw phosphate rock. Perhaps I can do no better than to quote here from an open letter, by me, to the directors, chemists, and agronomists of the agricultural experiment stations of the United States:

"A case in point is certain of the results embodied in a Bulletin of the Rhode Island Experiment Station, which have been widely quoted by certain interested parties who are determined to show good results with raw rock phosphate, regardless of the legitimacy of the methods and data used to do so. In order to make the situation clear in this case it should be stated that at the outset, in 1894, it was planned to apply like money values of the several phosphates rather than to use the same quantity of phosphoric acid in all cases, although several years later the plan was changed so as to equalize the applications and make the amounts of phosphoric acid the same on each plot.

"In 1894 and 1895, therefore, annual applications of the several phosphates were made, which cost exactly the same sum of money. In the autumn of 1895 the plots were all seeded to grass, and at this time, in order to give the most favorable conditions which were possible, the full money value of raw rock phosphate, for a three-year period, was applied before seeding; whereas no phosphate was applied that autumn to the plots receiving acid phosphate. The next spring one-third of the total three-year application was made; the second, another third was applied; and the third spring the final portion was used. The experiment was conducted on both limed and unlimed areas.

"The crops of the first two years have been estimated on the basis of common Eastern prices as follows:

70 lbs. of corn on the cob equal to a bushel.
80 cents per bushel for hard corn.
20 cents per bushel for soft corn and nubbins.
$5.00 per ton for corn stover.
50 cents per bushel for oats.
$12.00 per ton for oat straw.

"Table I. Showing the crop results with like money values of acid phosphate and raw rock phosphate:

	Acid Phosphate.		Raw Rock Phosphate.	
	Limed	Unlimed	Limed	Unlimed
	Value per acre			
Corn crop:	$49.21	$40.31	$17.35	$18.73
Oat crop:	53.24	65.51	39.80	38.45
	$102.45	$105.82	$57.15	$57.18

"The total difference in the two years, in favor of acid phosphate, on the limed land was $45.30 per acre, or enough to buy about four tons of acid phosphate. The difference in favor of the acid phosphate in the two years on the unlimed soil was $48.67 or enough to buy about four and a quarter tons of acid phosphate. The difference for the three years the land was in grass was in favor of the raw rock phosphate on the *unlimed area*, but the land was in the direst need of lime as shown by the gain of 5.6 tons of hay per acre when it was used with acid phosphate, and of 4.98 tons per acre when used with raw rock phosphate. It is evident, therefore, that the results from the unlimed areas are not to be taken as a guide, because no good farmer would attempt to use phosphate of any kind on such land until it had been limed. In other words, no one would think of keeping his soil out of condition to produce good crops for the sake of having it exert a slight solvent action on raw rock phosphate. In fact, Director Thorne, whose experiments have often been otherwise interpreted or represented (Official Report, Ohio State Board of Agriculture on Commercial Fertilizers, 1912, p. 50), says that 'it is not advisable to use it as a direct application to the land.'

"On the limed areas the total yeild of hay for the three years was 320 pounds greater with the raw rock phosphate, than with the acid phosphate. This quantity, after allowing 17 per cent for shrinkage, was worth at $17.00 per ton but $2.26, as against the loss the first two years of $45.30 per acre, by using the raw rock phosphate. In fact even this small sum is less than the accumulated interest on the extra returns from the earlier crops produced with acid phosphate, not to mention the longer interest period on the investment in the raw rock phosphate during the three years the land was in grass.

"It is indeed surprising, in view of these figures, how certain persons can have the face to cite the Rhode Island Station as having shown that raw rock is the more profitable source of phosphoric acid for our eastern soils, especially when but few of them are as favorable to raw rock phosphate as this particular acid soil at Kingston, which was exceptionally rich in humus."

Concerning the Ratios of Lime and Magnesia in Soils.

It was long ago pointed out by European investigators that, in case of an injurious excess of certain mineral elements in forms available to the plant, the addition of certain others had a counteracting effect. Later Loew advanced a new theory in explanation of the beneficial effect of lime upon its application to soils containing excessive amounts of magnesia. This was based upon the idea that the presence of unduly large ratios of magnesia to lime, in the plant, interfered with nucleo-proteid formation. This line of work was taken up also by several of his Japanese assistants and a vast amount of literature on the subject has been published. More recently Gile of Porto Rico and the writer have called attention to the fact that in the attempt to apply this theory conclusions have been drawn in some cases which were too far reaching and were not wholly justified by actual experience.

The question of the lime-magnesia ratio is nevertheless a point which must be borne in mind in connection with the treatment of soils; and on those where magnesia is present in amounts far in excess of the lime, the use of pure burned or slaked lime or pure ground limestone is preferable to the use of lime which is of a highly magnesian character. For such soils, also, the high grade sulphate of potash might be preferable to the double manure salt, which is rich in magnesia.

There are soils in New England on which the magnesia contained in limestone is positively helpful, from which it is to be inferred that there is sometimes a slight lack of magnesia in sufficiently available form to meet the full requirement of plants, or else, that it has some beneficial effect on the bacterial life of the soil as suggested by Hilgard and Lipman or in other obscure and unrecognized ways. It is a safe proposition to recommend the alternation of two

applications of comparatively pure lime with one of magnesian lime, particularly if ground limestone is used. This is for the reason that the magnesium carbonate of the ground limestone is not as readily dissolved and lost from the soil as the calcium carbonate.

The Effect of Soil Disinfectants.

Already in 1894 A. Girard observed a remarkably beneficial effect on the growth of plants where carbon disulphide had been added to soils for the purpose of destroying beet nematodes. This benefit was noted in connection with the growth of wheat, potatoes, beets, clover, oats, and other crops. Similar observations have been made by several other Europeans upon the after effect of carbon disulphide which had been used in combating phylloxera, which in Europe is a serious parasite of the grapevine.

Recently, Russell and Hutchinson of the Rothamsted Experimental Station have found if toluene, tricresol, chloroform, and various other substances, were added to soils, that certain microscopic animals including the amoebae and ciliates, were destroyed, whereupon the bacteria increased enormously and ammonification, or the formation of ammonia, went forward at a rapid rate, with the result that the productiveness of the soils was at least temporarily and greatly increased. They also found that this condition endured in certain cases for at least 200 days. Similar observations concerning the use of chlorid of lime, potassium permanganate, and other substances were made by Loew who found that the first of these was highly effective in curing a soil which had become sick and unfitted for the production of lilies.

Sodium in Connection with Plant Growth.

It was claimed many years ago by Wagner and Dorsch in Germany and by Atterberg in Sweden, that sodium salts could in some degree replace salts of potassium in plant nutrition. It was subsequently found, however, by correspondence with Atterberg that

he used a sea-sand as a medium in which to grow his plants and that it was not tested at the outset for its content of soda and potash. It was subsequently found to contain considerable quantities of soda, and it doubtless contained also some potash, which fact threw much doubt upon the full reliability of his results. Later, investigations of this subject were made by Hellriegel and Wilfarth at the Bernburg Experiment Station in Germany, and as early as 1894, experiments in this line were also begun at the Rhode Island Experiment Station, which have been continued without interruption to the present time. In connection with this work plants were grown in the field, in plots, in artificial soils, and in solutions, and these and the solutions were analyzed. The results of this work have shown beyond question that salts of sodium may perform beneficial physiological functions in connection with at least certain plants, whenever the supply of potash is inadequate. Evidence was secured, however, to the effect that it would not be wise in actual practice to omit a part of the necessary potash supply for the express purpose of making the soda effective.

There is probably at all times and in all soils enough soda to meet any possible necessary food demand of the plant for that element. In fact, it is even now disputed whether any of it is absolutely essential so long as plants find at their disposal all of the potash which they require.

The presence of sodium compounds in fertilizers used for certain agricultural plants serves, nevertheless, as a sort of insurance against a possible lack of potash, for the reason that if the potash supply runs short, soda may help it out to a marked extent. Furthermore, soda frequently conserves the potash supply of the soil by entering into the plant to such an extent as to prevent its taking up undue and unneeded amounts of the latter, if present in excess.

A practical illustration of the effect of sodium salts is furnished by the fact that in certain of the Rhode Island experiments, when as much as 330 pounds of muriate of potash, or the same equivalent of potassium carbonate, were used to the acre, the addition of sodium salts, regardless of whether carbonate of soda or common salt was selected, practically doubled the crop of mangels. These sodium salts under the same conditions also exerted a highly beneficial influence on turnips, radishes, and various other farm crops.

The previous reference to the conservation of the potassium supply of the soil will perhaps be made more clear when it is stated that experiments have shown that a certain minimum of potash is required to produce a given amount of dry matter in connection with any given plant. In such experiments, an abundance of all the other necessary elements is furnished. Similar experiments have been conducted to ascertain the minimum amount of phosphoric acid, of lime, magnesia, and nitrogen, which the plant must have. Having determined these minimum amounts, one might suppose that if they were added together, this would furnish a guide as to the quantities which would enable the plant to thrive normally. It appears, however, that such is not the case. In other words, plants must have a certain amount of basic substances such as lime, magnesia, soda, and potash, in considerable excess of the minimum requirement for each, and this excess is often referred to by the Germans as a "luxus" or luxury consumption. It is even probable, as shown by recent experiments, that silica, which is represented by the quartz rock and the common sand, with which we are all familiar, may likewise, when present in soluble form play a conserving part in furnishing some of this necessary excess of mineral matter which the plant seems to demand.

Some New Fertilizer Materials.

In closing, a word ought to be said about some of the new fertilizer materials which are coming on the market. Recently, a large number of patents have been taken out for various processes for rendering phosphates available and for the manufacture of phosphates containing high percentages of soluble or available phosphoric acid. Inventive genius, however, has not been directed solely in this direction, for the great problem of practically taking uncombined nitrogen out of the air, where it exists as a gas, and changing it economically into compounds which can be applied to the soil for the nourishment of the plant, has ceased to be a dream of the poet and of the scientific investigator, and has become a practical reality. Already for several years, the manufacture of

calcium cyanamid has been on a practical basis in Europe and it is now being produced on a large scale in this country.

Chemists have also devised still another process by which nitrogen can be taken from the air and combined by electrical means in such a way that the final product is calcium nitrate. Both of these processes for taking nitrogen out of the air are, however, dependent upon the generation of an exceedingly powerful electric current, and they are consequently conditioned upon cheap and abundant water power. The Germans realizing their somewhat helpless situation, on account of the lack of such water power, have been at work for some years in an attempt to devise a process by which nitrogen gas and hydrogen gas could be combined into ammonia, under conditions which would permit of the economic manufacture of ammonium compounds, where only the usual sources of power are available. It is now claimed that this process has been placed on a successful commercial basis and considerable amounts of sulphate of ammonia, which are being manufactured in this way, are already being placed on the market.

The latest addition to this galaxy of new nitrogenous fertilizers is nitrate of ammonia, which is now being introduced in an experimental way. Its future, however, can only be surmised.

The calcium cyanamid, unfortunately, is open to the objection that, if used in the field in large quantities as the sole or chief source of nitrogen, it exerts a poisonous effect for the first two or three weeks, which is sometimes not fully overcome during the entire life of the plant. This is supposed to be due to the formation in the moist soil, of some of the poisonous dicyanamid, although a portion may break up at once into urea and subsequently into ammonium compounds, and ultimately, nitrates.

From what has been presented, it is evident that the world has been making rapid progress in all lines of investigation which have to do with soil treatment, fertilization, and plant production. We have indeed, as expressed recently by Mr. W. H. Bowker, tapped the inexhaustible supply of the heavens in order to secure nitrogen for the feeding of plants and animals and for the continued sustenance of man. The discoveries of enormous phosphate deposits in the West, in northern Africa, extending as they do from one side of the continent to the other, in China, Russia, and in other portions

of the world, together with the practically inexhaustible supplies of potash salts in Germany and the prospect of other similar discoveries in other lands, all add further evidence of the provision of an all-wise Providence for the perpetuation of a race of human beings with sufficient intellectual endowment to delve into the depths of the earth for its hidden treasures, into the mysteries of science as a means of discovering the application of the laws of the universe to human existence, and wise enough to look upon the opportunity for labor as one of the greatest blessings bestowed upon the human race.

MAKING A NEW VARIETY OF ASPARAGUS.

By J. B. Norton, Washington, D. C.

Delivered before the Society, February 14, 1914.

Long ages before your waiter placed that steaming platter of luscious asparagus on toast in front of you, the cave men of Anjou, the lake dwellers of Switzerland, and the wild man of the English dunes devoured asparagus shoots in no way inferior to those shipped into your home from the Concord fields. Growing in the cradle of civilization the common asparagus has spread with the spread of culture. From old Nebuchadnezzer, the original vegetarian who cured his nervous dyspepsia with "grass," down through Persia to Greece, Rome, France, England, and America by turn its record goes. Asparagus it has always been and asparagus it is today. Our best of today is not much better than that of the old Roman gardener who produced stalks that weighed over five ounces. Many other vegetables have been changed so by their growers that at present we have hard work to connect them up with their wild parent types, while asparagus is still unchanged.

Now why has this been? Some of its admirers say that it is because it is already perfect. A gift of the gods — a finished food plant. While we must admit with those who have tried to kill out an old bed that it undoubtedly seems endowed with immortality, nevertheless, while it is all good yet some asparagus is better than others.

The many forms of Brassica developed from one original type show that man, even in a comparatively short time, can with the aid of variation produce marvellous changes in wild plants. Then why don't we find distinct varieties of asparagus? Simply because it is a dioecious plant, with the male and female flowers on separate individuals, and it is only in the last few years that our knowledge

of the workings of heredity has been sufficient to conquer a difficulty of this kind.

If the asparagus rust had not come into this country as an undesirable alien we might have been content to go along as we were twenty years ago when there was little uniformity of type in an asparagus field. Asparagus has persisted in remaining uncivilized in all its habits of growth and reproduction. No other cultivated plant establishes itself so readily in our wild growth and that without any reversion in type. Go where you will in New England, you will find wild asparagus. I claim we have only captured a wild plant and have as yet to domesticate it.

I defy any one of you to go into the market, pick up a bunch of asparagus and tell me from what variety it came. It can't be done! And yet asparagus has been grown in America for generations and has been "improved" by horticulturists until twenty years ago we had numerous local varieties or named strains which with one or two exceptions were so much alike that their own parents could not tell them apart.

The introduction of the asparagus rust from Europe changed the face of the asparagus map. From around New York where it was probably accidentally introduced in 1895 it spread in every direction, leaving a wreck of rusted-out fields in its trail reaching the Pacific coast in 1901.

Palmetto and Argenteuil were the only varieties that did not go down before its attack. Beds of these strains that were planted soon after the rust came in are still paying.

As soon as the rust began its devastation, remedial measures were demanded and spraying work was taken up by experiment stations in different States. Except in California where Professor Smith developed the dry sulphur spray, this work was not taken up by the growers. It was too expensive for the small growers and one farmer could reinfect every field in the neighborhood by leaving his field unsprayed.

Breeding work for disease-resistant strains of cotton, cow peas, etc., about this time began to receive attention from the general public. From the successes with this work in the South, the asparagus growers in Concord and vicinity conceived the idea that it would be a good thing if a rust-resistant asparagus could be devel-

oped. They proceeded with their usual promptness to carry out the idea. The Massachusetts Asparagus Growers' Association was organized in the spring of 1906, having as its object "the restoration of asparagus to its immunity from rust or the discovery of a species that shall be rust resistant and the dissemination of information in relation to its growing and marketing." This association interested the Massachusetts Experiment Station and the United States Department of Agriculture, and as a result a coöperative asparagus experiment station was established at Concord, Mass. At the present time the breeding work is being done by the Bureau of Plant Industry, although the results are shared in by the Massachusetts station which has charge of the experiments on asparagus fertilizer at the sub-station.

No attempts have been made to experiment with the control of rust by spraying, it being felt that success of the breeding work would mean so much more to the grower.

Before taking up the breeding work it is desirable that we know something of the disease. However, the methods of breeding used would be the same no matter what the life history of the fungus.

Asparagus rust was described in 1805 by DeCandolle as *Puccinia asparagi*. It is one of the many rusts that affect economic plants and cause millions of dollars' annual loss to the farmers of this country. Differing from wheat rust, which has its spring stage on the barberry, all of the stages of this rust are on asparagus.

It goes through the winter as a small two-celled spore. In the early spring about the time the asparagus is coming up these spores sprout and send out a short filament on which is borne four sporidia. These sporidia are blown or carried by water into contact with the young shoots. They germinate and send their filament into the asparagus stalk and if the latter is not cut and marketed the filament grows, and about a month later ripens into the spring stage or cluster cup of the rust. This stage is rarely seen by the ordinary grower, as it rarely appears in a commercial bed. The spores from this stage are carried by air currents to other asparagus plants and germinate when conditions are right, i. e., warm dewy nights. The mycelial filaments pass through the stomata of the epidermis and effect a lodgment in the living tissues of the aspara-

gus host. From this infection the summer rust develops, appearing in about two weeks after infection. The rust spores of this stage form under the epidermis and as they grow, break through, expose the plant to the drying action of the wind and sun. Sometimes when the attack is bad the epidermis peels off over large areas. This summer stage is the one that does the damage, as its infection period is less than two weeks, and there is room for many generations during one season so that a susceptible field is usually killed back to the ground by the end of August. Usually the summer rust is followed by the winter stage or black rust which appears in the same spot where a few days before the red rust was losing its spores for further spread of the rust. These black rust spores go through the winter and sprout next spring to start a new crop of rust. The damage is apparent in the reduced cut of the next season.

On taking up breeding work the most important thing is to get started right. Material to select from was gathered from all over the world. All possible sources of good asparagus were searched and are still being called on to supply breeding material. This material was planted out in trial fields at Concord and in the fall of 1908 was selected for rust resistance. The fields were mapped and the resistant plants were located so that they could be marked in the fields in the spring of 1909. No one variety was found good enough to start from alone. Most lots were discarded altogether. The best resistant male plant was in a strain called New American, while the best female was in Reading Giant. In 1909 the selected plants were allowed to grow while the non-select were cut. "Glassine" paper bags were placed over branches on the female plants before they bloomed and the flowers underneath were later pollinated from the flowers of the best of the select males. The seed from these hand pollinated lots was saved, and small tests were started in the greenhouses in Washington that winter. The next spring these test lots were planted in a small plot at Concord for a rust test. When the rust attack came on, every lot that had been pollinated with the resistant male could be identified by a casual observer.

The lot from the best female plant crossed with the best male had scarcely any rust and was so good in vigor that the success of this

trial was beyond all our hopes. Now that it had been shown that rust resistance was transmitted in about the same degree that the parent showed resistance the search for good parents began with renewed energy. In 1910 more pedigree pollinations had been made. More selections were made in the fall. In 1911 the best plants were covered with wire cages to keep out the bees and the flowers were pollinated by hand with pollen from the good male. Unfortunately it was found that a small bee was creeping in between the meshes of the fly screen used. In this way many of the supposed pure pedigree seedlings were mixed with rusty and undesirable blood.

In 1912–13 cheesecloth screens were used and pure seed was obtained. The rust tests in 1911 and 1912 were practically failures on account of the absence of strong rust infection due to unfavorable weather but 1913 showed that one new female plant was even more satisfactory than the one found in 1910. In every way this plant gives satisfactory seedlings when crossed with the good male plant. These two plants will be set apart in a breeding field and from the progeny of this seed patch a new asparagus will come that will take the place of that grown now.

The hard work and experimenting that it has taken will be amply repaid by the added production of this peerless vegetable. The few thousand dollars that an experiment like this costs will be returned to the country many fold.

When we think that one of our trial plots the first half season it was cut produced at the rate of 10,000 pounds per acre, you can see that the work is liable to pay for itself.

In addition to the breeding work with the common asparagus many wild species have been tested out for rust resistance and possible commercial value. So far all the close relatives of *Asparagus officinalis* have been attacked by the rust in some degree. One Chinese species, *A. davuricus*, is nearly immune and fortunately has given fertile hybrids with the best rust resistant male. From these hybrids another strain of asparagus may be developed that will do well where our asparagus will not grow well.

Asparagus as we go south into Florida and Texas produces such small shoots that it is not of value commercially. It is hoped that from some of these species introduced from Africa or Asia a form

will be obtained that will give satisfactory results. After we give these new strains to the growers it is necessary that they be handled in the right way to make the most of them. Preparation of the land before planting by the use of cover crops and green manure, proper fertilization, careful planting, and cultivation, destruction of insect enemies, and above all careful and up-to-date methods of cutting and marketing.

While the new strain is rust proof it is not fool proof and can be spoiled in the hands of a poor grower. A poor crop can be produced with it just as easily as with a poor variety.

SPECIAL COURSE OF LECTURES AND DEMONSTRATIONS ON FRUIT GROWING.

During the week of February 24–28, 1914, the Massachusetts Horticultural Society in coöperation with the Extension Service of the Massachusetts Agricultural College offered a special course of lectures and demonstrations on the subject of fruit culture in New England.

The course was planned to cover the entire field of orchard fruits, including the selection of sites for the orchard, varieties of fruits best adapted for New England, fertilizing, grafting, pruning, spraying, packing, and marketing the product.

The lectures were given mainly by members of the staff of the Massachusetts Agricultural College who have kindly prepared the following liberal astracts of their several topics.

The daily sessions were largely attended by persons practically interested in the subject and demonstrated the increasing attention now being given to the possibilities of successful and profitable fruit growing in the New England States.

VARIETIES OF FRUITS.

By Dr. J. K. Shaw.

The question of what varieties to plant is a perennial one. New candidates for favor appear from time to time and some prove worthy of a place in our orchards while others are rejected.

Changing conditions of culture and markets are constantly making changes in the relative value of well-known sorts. The McIntosh is an example; it has been known over 40 years but it is only in recent years, since we have known how to combat the apple scab, that it has found favor.

A mistake in the choice of varieties is corrected only with difficulty and at the expense of much time and labor. With the development and specialization of the orchard business the choice of varieties will continue to be of increasing importance.

Any variety in order to be commercially successful must possess in considerable degree most, if not all, of the following characteristics of the tree and fruit: —

The Tree should have

Good form and habit. The head should be upright and not too dense. A fault of the Rhode Island Greening is its drooping habit, while the Sutton is too upright and goes up into the air too rapidly; the Spy makes a dense head. McIntosh, Wealthy, and Gravenstein are quite satisfactory in form and habit.

Resistance to disease and insects. The McIntosh is subject to scab. Certain varieties of peaches and most of the European varieties of plums are badly affected with the brown rot, while the Japanese varieties of plums and most of the North China peaches are less affected by this disease. The most serious objection to the Baldwin is its tendency to suffer from the Baldwin spot. Certain varieties are going out of cultivation because they are preferred by the apple maggot. No variety is free from all insects and diseases and a variety badly affected by one may be comparatively free from another.

Vigor. A vigorous tree is apt to be able to resist disease and most of our popular sorts are the stronger growers. Generally the more vigorous a variety is the better, but it may possibly be a fault in extreme cases where it exists at the expense of fruit bearing. With the present development of better orchard methods some of the weaker growing varieties are gaining in favor, but it is easier and cheaper to hold back a vigorous variety than to push a weak one.

Productiveness. This is perhaps the most important character of all — if a tree does not bear well it has small value. Not only must the variety bear abundantly, but also regularly and at an early age. The annual bearing habit is a desirable one for many reasons, and an orchard that is long in coming into bearing is

piling up expense of maintenance that must always be a load to carry. On the other hand it is probable that a variety coming into bearing early may be short lived, but this may be overcome in part at least by good methods of cultivation as the tree gets on in years.

Good growth in the Nursery. Nurserymen have had much to do with the comparative popularity of different varieties and it is but natural that they should push those sorts that yield the highest proportion of number one trees, for it is on these that he makes most of his profit. The character of the tree in the orchard is of more account than its growth in the nursery and the two may be quite different.

The Fruit should have

Good size and form. In general, large apples bring a better price than medium sized ones, yet there must be a limit to the demand for big apples. Undersize is never desirable. Apples that are oblong or irregular in form are not as desirable as those that are more regular and symmetrical. Above all it is advantageous that all the apples of a variety be uniform in both size and form. Wealthy excels in this, while Early Harvest is variable; it is much easier to grade and pack Wealthy than Early Harvest. Some varieties are more uniform in other characters such as time of ripening; uniformity in all characters is desirable.

Attractive appearance. Most people buy apples with their eyes. Probably they will become more discriminating as time goes by but always the bright red attractive apple will be preferred over the dull red, green, or otherwise unattractive one. Attractive appearance will always be an important asset to the variety that possesses it in high degree.

Good Quality. This is the most important quality of a variety. People are becoming more insistent on good quality and the day of the mediocre or inferior variety is passing and no variety should be planted that is not at least good in quality.

Market Demand. It is much easier to sell a variety that is well known in the market than one that is little known. The Baldwin is known everywhere that apples are known and its value does not have to be explained. If one is planting for a local market this is of

less account, but if one is planting for the general market he should hesitate to plant unknown sorts no matter how good they may be. Different markets prefer different varieties. Rhode Island Greenings sell readily in New York but go slowly in Boston. The orchardist should inquire carefully into the preferences of his prospective market.

One should choose varieties that are adapted to his special conditions; the ones that he can grow as well or better than anybody else on earth. A variety that succeeds well under one set of conditions may be much less desirable under different conditions. This may be discussed under the following heads:

The Market.

Market preferences have been mentioned. For the general market a short list of varieties is best, generally not more than three or four, and this in order to lengthen the picking season and perhaps to insure cross pollination and more uniform crops from year to year. It is easier to sell a carload than a dozen barrels in the large general market. For a local or special market a longer list of varieties is usually indicated, one that will furnish a continuous supply all through the season. If there is a period of short supply some one else may capture your customers.

The Soil.

We are just beginning to appreciate the soil preferences of different varieties of apples and probably other fruits have such preferences as well. Then Baldwin succeeds best on a sandy loam, giving more attractive and better quality fruit, while the Hubbardston prefers a still lighter soil. On the other hand the Rhode Island Greening does best on a moderately heavy clay loam. One must inquire carefully into the soil preferences of possible varieties and see if they are suited to the soils that are to be utilized for the prospective orchard.

The Climate.

Most varieties are at their best over a comparatively narrow range of territory. The varieties of New England are different

from those of New Jersey and Maryland, or of Illinois and Missouri, largely on account of climatic differences. It is probable that southern, central, and northern New England should have quite different lists of varieties on account of differences in climatic conditions. The Baldwin is not desirable north of southern New Hampshire, while it is at its best in southern New Hampshire and Massachusetts. There is always a tendency for well-known and successful varieties to spread beyond the section most favorable to their development. Differences of a few hundred feet in elevation may make a marked difference in climatic conditions. Beware of varieties that succeed well in southern or far western conditions.

Methods of Culture.

The methods of culture can be largely modified to suit the variety, yet the probable methods to be followed have a bearing on the selection of varieties. Wealthy, Williams, or Wagener will need to be pushed by comparatively high cultivation after they come into full bearing, while Baldwin, Rhode Island Greening, and Northern Spy are apt to be very vigorous even to old age, though in a soil only moderately fertile.

Personal Preference.

Finally, the likes and dislikes of the grower should have consideration. One is more likely to succeed well with a variety that he likes and believes in than with one that he thinks less of.

Varieties.

It appears from the foregoing discussion that the choice of varieties for any particular orchard depends upon a variety of conditions and the prospective orchardist ought to study his own conditions very carefully and learn as much as possible about the characteristics of the different varieties in order to make the wisest choice. Following is a brief list of some of the most desirable varieties for Massachusetts with a few comments on the characteristics of some of them:

Baldwin This has long been and will doubtless continue to be the leading main crop variety for southern New England. The tree is vigorous and long lived and generally healthy, though the leaves sometimes suffer from the scab disease and the fruit has in recent years been badly blemished by the physiological fruit spot for which no certain remedy is known. It bears rather late in life but heavily, usually in alternate years. It is best adapted to medium or light loams, or heavy sandy loams with slightly heavier subsoil. It is a question if it is wise to plant it much above 1200 feet in this state. It is a pretty good keeper and sells readily in all markets.

Fall Pippin. This is not much planted, being late in coming into bearing and a green or yellow apple. The tree is large and long lived and vigorous, but somewhat subject to scab on both leaves and fruit. It ripens unevenly and ought to have several pickings. It is suited to a little heavier soil than the Baldwin and it is good for the home orchard and the local market.

Gravenstein. This is one of the best varieties both for table and kitchen use. Unfortunately the tree is much subject to winter injury and often goes to pieces just as it comes into full bearing. On this account much attention should be given to inducing the tree to ripen up its wood early in the fall. It should be planted on a medium dryish sandy loam with a fine sandy subsoil and nitrogenous fertilizers given sparingly if at all. It ripens unevenly and requires several pickings.

McIntosh. This is about the highest quality variety we have. It has been heavily planted in recent years and will, on account of its high quality, do much to extend the apple market. The tree is excellent but must be well sprayed to check the scab on the fruit. It comes into bearing moderately early and bears moderate to good crops almost annually and brings the highest price in the market. It is of tender flesh and must be handled with care. It does best on a fine sandy loam or light clay loam.

Northern Spy. This is another excellent apple coming later in the season than the McIntosh. The tree is very vigorous and needs to have the top kept open by judicious pruning and care should be taken that it does not split down under a crop of fruit. It is rather uncertain in its behavior, sometimes succeeding well and other

times being pretty near a failure. It does best on a loamy soil, with a somewhat lighter subsoil. It comes into bearing late and is somewhat subject to scab.

Oldenburg. This is a good early cooking apple, desirable as a filler. The tree requires pushing as it gets into full bearing and it is one of the earliest to begin to bear. The fruit is handsome, and uniform in size and shape.

Porter. This good old sort seems to be going out of cultivation perhaps on account of its being so often infested with the apple maggot. It is worthy of attention for the home or local market.

Red Astrachan. This is about the earliest red apple good for cooking and fairly good to eat. It is generally an early and fairly abundant bearer and sells readily especially in the local market. It needs a fertile soil and good care.

Rhode Island Greening. This apple sells readily in New York but slowly in Boston. It usually brings a somewhat lower price than red varieties of the same season. It is commonly regarded as a kitchen sort but is esteemed for table use by those who know it well. The tree is vigorous and comes into bearing about the time of the Baldwin. The fruit is subject to scab, especially late in the season. It is adapted to a moderately heavy, moist, silty loam. It sometimes scalds badly in storage but this may be overcome by wise handling. It is worth planting for the general market.

Roxbury Russet. This excellent late-keeping variety is not now being planted very much but it should not be allowed to pass from cultivation. It does well in a deep loamy soil with a moderately heavy subsoil; somewhat heavier than good Baldwin soil. It is one of the good varieties for table use.

Tompkins King. This apple, best known simply as the King, is one of the best early-winter table apples and always brings a high price in the market. It bears quite regularly but only moderate or light crops. The tree resembles the Gravenstein in its liability to winter injury. It needs a fertile, well-drained, light, mellow, loamy soil. It must be sold at a good price in order to be profitable.

Wagener. This is one of the best fillers as it is later in season than most sorts used for this purpose. It is vigorous when young but is short lived. It is an early bearer and very prolific while it

lasts and very good in quality. Its soil requirements are much like the Spy though possibly less exacting.

Wealthy. This is another good filler. The tree is vigorous when young but needs pushing as it gets older. The fruit is of good quality and very uniform in size and shape.

Williams. This is one of the best early table apples. The tree is only moderately vigorous and needs a fertile soil full of humus. It bears early, regularly, and usually heavily. It is handsome in appearance but with a tender flesh.

Yellow Transparent. This is the earliest good variety we have. The tree is only moderately vigorous and bears early and abundantly. The flesh is very tender and must be handled with the greatest care. It is a good filler for the local market.

Most of the attention given to fruit just now goes to the apple but there is no reason why the other fruits should not be more planted in Massachusetts. Some of the desirable varieties are here given.

Pears. Bartlett, Clapp Favorite, Bosc, Lawrence, Seckel.

Quince. Champion and Orange.

Peaches. Belle of Georgia, Carman, Champion, Elberta, Hiley, Greensboro, Waddell. The J. H. Hale is a new variety that is attracting much attention just now and it may largely replace the Elberta.

Plums. Bradshaw, Burbank, Fellenburg, French Damson, Red June.

Cherries. Early Richmond, English Morello, Montmorency, Gov. Wood, Schmidt, Windsor.

Grapes. Delaware, Moore Early, Green Mountain, Worden, Niagara, Salem.

Blackberries. El Dorado, Snyder.

Raspberries. Marlboro, Herbert, Cuthbert, Kansas, Plum Farmer.

Currants. Cherry, Perfection, Wilder.

Gooseberries. Downing, Industry.

Strawberries. Abington, Minute Man, Parsons Beauty, Sample, Senator Dunlap.

ORCHARD SITES.

By Prof. F. C. Sears.

Probably, in common with most of our other orchard operations, the choosing of a site for the new orchard deserves more consideration than it usually receives. Certainly a great many orchards have been set on land but poorly adapted to such purposes, and while orchards will thrive surprisingly well under somewhat unfavorable conditions and while, moreover, our knowledge of the exact conditions which are best is still lamentably small, yet enough is known to make it well worth while to give the question careful consideration.

The following are some of the more important points to be considered in choosing an orchard site. First, Is the land adapted to the fruit to be grown? This is probably one of the most important questions, but unfortunately is one on which we have the least reliable data. We know in a general way that peaches do best on relatively light soil, while pears and plums prefer a somewhat heavier soil, but we are only beginning to realize that there are decided differences in the soil preferences of different varieties within a single class of fruit. This question of the adaptation of soils to varieties has been studied most fully by Mr. H. J. Wilder of the Bureau of Soils and the following suggestions will serve as illustrations of his ideas as to the best soils for a few of our leading apple varieties.

Baldwin soils. If soils are thought of as grading from heavy to light corresponding with the range from clay to sand then a Baldwin soil is medium to semi-light. It ought to be a soil that dries out quickly after rain and in no sense a moist soil. The subsoil should be light enough to drain off readily any surplus moisture.

When the Baldwin is grown on soils which are too light the fruit does not keep so well and does not reach the highest quality. If grown on soil which is too heavy and wet the color is poor and the skin is apt to be dull and greasy.

Rhode Island Greening soils. The soils for Rhode Island Greening are very different from those on which the Baldwin thrives best. In fact they may be considered as extremes. The Rhode Island Greening prefers a medium loam surface underlain with a subsoil that is a medium loam to a plastic clay loam. Corn grown on such soil ought to mature late and the lower leaves should stay green until time for cutting. Such soils maintain a long season of growth under uniform conditions of moisture which gives the crisp firm texture of high grade Rhode Island Greenings.

Hubbardston. The heaviest soils adapted to Hubbardston lap over a little on to the lightest Baldwin soils. It will grow on the lightest soils of any of our varieties, but will not do well on poor light sands as it does not reach sufficient size. Soil must be mellow and a rich fine sandy loam of twelve inches in depth with a subsoil of the same texture will give good results. A subsoil which has sufficient clay to make the sandy material stick together is excellent, but subsoils should never be heavy. On a heavy soil the skin of the Hubbardston is apt to be greasy, the color poor, and the flavor not well developed.

These few illustrations will serve to show what has been worked out in reference to some of our varieties and more information along the same line for all classes of fruits is urgently needed.

Some of the other questions which would come up in connection with the soil of the proposed site would be the question of its fertility; whether the land is run out or has plenty of plant food in it; the ease of working the land; whether it is stony heavy clay or contains bowlders which interfere with the work in the orchard; whether the land is sour or not; if it is lime must be applied to correct this defect; whether the land is well supplied with humus or not.

In the subsoil two questions are of especial importance. First the ease with which the roots can penetrate the subsoil and second the question as to its fertility, pure sand being less desirable than gravelly clay.

Water drainage, both surface and sub drainage, is of extreme importance in the orchard. The surface drainage ought to be sufficient to carry off any surface water and still should not be so much as to cause washing of the soil or loss of water from showers

in summer when water may be needed. The under drainage is generally of vital importance as trees do not usually thrive in a wet soil. Occasionally trees may be seen with their roots right in the water and still do well, but as a rule wet, poorly-drained soil gives a poor growth and makes the trees liable to much greater damage from winter injury.

Atmospheric drainage is another question of importance in relation to the orchard site though its importance varies decidedly in different sections. Where late spring frosts are troublesome good atmospheric drainage is imperative. In sections where frosts seldom occur its importance is naturally much less. Two or three points should be considered if frosts are likely to occur and these are, first, whether the land has sufficient slope to carry off the cold air. This does not require a heavy slope by any means. Second, whether there is cold air draining down onto the orchard site from slopes above. This is likely to lead to trouble as it means a much larger amount of cold air on the orchard. Third, whether there is any obstruction at the bottom of the orchard to hold back the cold air.

The aspect or slope is another question worthy of careful consideration, particularly the question of the slope with reference to the prevailing wind. Where heavy gales are likely to strike in from the northwest in the autumn, as frequently happens in orchard sections, some slope other than the northwest is desirable. In sections where frosts are not to be feared a southern slope is desirable as it gives better color.

The last point to be considered is the question of wind breaks and these are of decided importance in any windy section. Besides the fact that the orchard man can work more comfortably in a sheltered location it frequently happens that much better work can be done than if the orchard is exposed to the wind. This is particularly true of spraying. It is frequently impossible to do a satisfactory job of spraying when the orchard is on an exposed site, while if it is sheltered the work may be carried on satisfactorily. Pruning, picking, and in fact most other operations are likely to be interfered with by severe winds. Lastly it is worth while to consider what species of trees should make up the wind break. Those sorts which are likely to harbor either insects or fungous diseases

that attack the orchard trees should be rigorously excluded. Pines and spruces, among evergreen trees, and rock maples, among deciduous trees, seem to be especially satisfactory.

FERTILIZERS FOR THE ORCHARD.

By Henri Haskins.

A fertilizer may be considered any material which furnishes in suitable and available form the four elements of plant food, nitrogen, phosphoric acid, potash, and lime. There are seven other elements just as essential to plant growth as the four mentioned. The others, however, are furnished in abundance from the air and from the soil. Nitrogen, phosphoric acid, potash, and lime have become depleted by constant cropping and by poor management of the soil as regards furnishing these elements of plant food artificially. These elements are taken from the soil in larger quantities than the other constituents, and for this reason the soil becomes depleted of them sooner. A familiarity with these four essential elements is absolutely necessary in order to understand the principles underlying economical fertilization for various crops.

Nitrogen.

Four-fifths of our atmosphere is composed of the gas, nitrogen Only one class of plants can make use of this inexhaustible nitrogen supply. These plants are members of the *Leguminosæ* family. It is, therefore, good economy to plan a rotation to include legumes.

Nitrogen is the most expensive element of plant food, costing four or five times as much per pound as do phosphoric acid and potash.

The function of nitrogen is to cause a large development of stem and leaf. The use of an excessive amount of nitrogen delays fruit and seed development.

The feeding value of all plants may be increased by supplying an abundance of nitrogen, and when this element is lacking the feeding value of plants is materially lowered.

There are three forms of nitrogen which should be considered by anyone compounding a complete fertilizer:

1. Nitrogen in the form of nitrate, illustrated by nitrate of soda, nitrate of potash, and nitrate of lime. This salt is soluble in water, is readily diffused in the soil, and is immediately available to growing vegetation. All nitrogen is taken up by the growing plant in the form of nitrates or nitrites.

2. Sulphate of ammonia. This is a mineral form of nitrogen, soluble in water, but not immediately available to the growing plant. Its ammonia must first be changed in the soil by nitrifying bacteria before the nitrogen may be assimilated by vegetation.

3. The organic forms of nitrogen such as tankage, dried blood, the farm manures, etc. These must first undergo decomposition in the soil, changing the nitrogen of the organic compounds to an ammonia form. Nitrifying bacteria subsequently change these ammoniates to nitrates. This process must take place before the nitrogen in these products can be assimilated.

These three forms of nitrogen-furnishing chemicals and raw products furnish means by which the farmer is able to compound a fertilizer that may be applied at the time his crop is planted and which will carry the plant from the period of germination to its maturity. The proportion of nitrogen to be supplied by each one of these forms of nitrogen varies with individual crops. Usually from one-third to one-half may be supplied from mineral sources, and half from high-grade organic animal and vegetable products.

Some of the products furnishing nitrogen are: nitrate of soda, nitrate of potash, ammonium sulphate, calcium cyanamid, blood, different grades of tankage, dry ground fish, steamed bone, cotton-seed meal, castor pomace.

Potash.

Potash is never found in a free state in nature. In our country it is usually found associated with silica and is found in some of our natural rocks such as feldspars and granites. Our commercial supply of potash comes from the Stassfurt mines in Germany.

Potash is not as readily leached out of the soil as is nitrogen. It may be found accumulated in the stems and leaves of plants.

Different soils have different degrees of ability to retain potash. Clay soils retain potash better than sandy soils, but the latter may be improved in this respect by increasing the organic matter and humus.

The function of potash is to favor the development of the sugars and starches. It is important in wood development and in the growth of the fleshy part of fruits and vegetables. It has a very important function in neutralizing fruit and vegetable acids.

Some of the potash salts commonly known are: high grade sulphate of potash, sulphate of potash-magnesia, muriate of potash, carbonate of potash, kainit.

Phosphoric Acid.

Phosphoric acid, like potash, is always found associated with other elements. It is largely found in combination with lime as tricalcium phosphate, although sometimes it may be found in combination with iron and alumina.

There is little danger of loss of phosphoric acid from leaching. This element is found in the largest quantities in the grain and seeds of plants.

Rock phosphate is the source of the bulk of phosphoric acid known to commerce, although bones and basic slag phosphate furnish a large quantity of phosphoric acid. The treatment of ground rock phosphate with sulphuric acid or oil of vitriol furnishes the different grades of acid phosphate known to commerce. The acid phosphates usually carry three forms of phosphoric acid:

1. Monocalcium phosphate, the portion soluble in water.
2. Dicalcium phosphate, that portion which, although not soluble in water, is dissolved by the soil solutions. (Called also reverted phosphoric acid.)
3. Tricalcium phosphate, that portion which is not dissolved by the soil solutions and which would not be available the first season.

Available phosphoric acid means the sum of the soluble and reverted phosphoric acids in any fertilizer.

The function of phosphoric acid is to favor the maturity of the plant. It favors the transformation of proteids in the seed, promoting maturity and seed formation.

Some of the sources of phosphoric acid are: acid phosphate, dissolved bone black, dissolved bone, basic slag phosphate, fine ground bone meal.

Lime.

The use of this element artificially is perhaps not called for in order to furnish the plant food, calcium. The benefit from an application of lime is largely to counteract acid principles in the soil. It also improves the mechanical condition of soils. A hydrated lime applied to a heavy clay soil causes flocculation of the clay particles, thereby making the soil more open and porous, and improving its capillarity. Fine ground limestone or marl or air-slaked lime used on a light sandy or gravelly soil acts as a sort of binding agency, making such soils more retentive of plant food and improving their capillarity.

Another effect of the application of lime is the liberation of potash and phosphoric acid already existing in the soil. This is brought about by a transformation of bases and acids in the soil, the lime going to the silicic acid forming silicate of lime with the consequent liberation of potash which can be used by the growing plant. In the liberation of phosphoric acid, the lime being the stronger base displaces iron and alumina which are in combination with the phosphoric acid and forms calcium phosphate in the soil. This product is more soluble in the soil solutions than the iron and alumina phosphates. Lime also favors the more rapid decomposition of existing organic matter in the soil, thereby gradually furnishing available nitrogen to the plant. Lime aids nitrification by furnishing the base calcium with which the nitric acid which is produced by the nitrifying organisms in the soil may unite.

An acid soil will show a red coloration with blue litmus paper. The litmus paper test is a qualitative test for acidity in soils. In order to determine definitely how much lime a soil needs to produce a neutral soil, the soil must be submitted to a chemist. Soils should contain at least one per cent of calcium carbonate.

The Purchasing of Fertilizers and Fertilizing Material.

In purchasing fertilizers it is much more economical to order in carload lots and buy for cash. This holds with the purchase of

factory-mixed goods as well as chemicals. If it is not possible to use a whole carload of fertilizer on one farm, several neighbors should get together and buy their fertilizer in common.

If it seems best to buy factory-mixed fertilizer, by all means buy a high grade product; that is, one which will value commercially over $25 per ton. It should be the practice of everyone buying fertilizers to figure out the number of pounds of the different elements of plant food which will be furnished by the formula purchased; in other words, get into the habit of buying pounds of plant food rather than tons of fertilizer.

Unquestionably the cost of plant food in chemicals and raw products is much less than when the plant food is bought in the form of factory-mixed fertilizers. Oftentimes a good bargain can be made by submitting a fertilizer formula to several manufacturers and asking for bids. Of course, the basis should be cash for the mixed product.

Fertilizers for Fruit.

A young orchard will take care of itself so far as the application of fertilizers goes if a cultivated crop is grown between the rows. It is well to cultivate an orchard. The cultivation results in an earth mulch which prevents the rapid evaporation of moisture through capillary attraction. The upkeep of an orchard can be carried out more economically if the orchard is established on a rich, well-drained clay loam. Such a soil will retain both plant food and moisture better than the lighter soils.

It should be remembered that trees in bearing draw from the soil for two crops: first, new growth of wood and leaves; and second, fruit.

Approximate Amount of Plant Food Removed Annually per Acre by Fruit, Wood, and Leaf Growth of Forty Mature Apple Trees.

	From Fruit. 218 barrels per acre. (Pounds).	From Fruit, Wood and Leaf. (Pounds).
Nitrogen	13.1	23.6
Potash	32.7	36.5
Phosphoric acid	6.54	8.3
Lime	3.27	21.8

Fertilizer for Bearing Orchard (Lbs. per acre).

500 pounds basic slag phosphate,
350 " sulphate of potash-magnesia, *or*
175 " high grade sulphate of potash,
150 " nitrate of soda.

Approximate Amount of Plant Food Removed Annually per Acre by Fruit, Wood, and Leaf Growth of one hundred Mature Peach Trees.

	From 400 bushels fruit (Pounds).	From Fruit, wood and leaf. (Pounds).
Nitrogen	22.2	78.5
Potash	45.5	90.0
Phosphoric acid	11.0	21.0
Lime	2.8	130.0

Fertilizer for Bearing Orchard (Lbs. per acre).

600 pounds basic slag phosphate,
250 " high grade sulphate of potash,
100 " nitrate of soda,
100 " ammonium sulphate.

Approximate Amount of Plant Food Removed Annually per Acre by Fruit, Wood, and Leaf Growth of one hundred Mature Pear Trees, one hundred twenty Mature Plum Trees, or one hundred sixty Mature Quince Trees.

	From Fruit (Pounds).	From Fruit, Wood and Leaf. (Pounds).
Nitrogen	12.	29.
Potash	21.	33.
Phosphoric acid	5.	9.
Lime	3.	40.

Fertilizer for Bearing Trees (per acre).

500 pounds basic slag phosphate,
200 " high grade sulphate of potash,
200 " nitrate of soda.

The most economical practice, perhaps, in fruit growing is to grow as a cover crop either crimson clover or some other member of the legume family. These plants, when given the right environment, take nitrogen freely from the atmosphere. This crop can subsequently be plowed under to furnish valuable organic matter and humus.

Approximate amount of plant food contained per acre in a crop of:

Crop.		Nitrogen	Phosphoric Acid	Potash
Crimson clover . . .	(16000 lbs.)	72.	19.	64.
Vetch	(10000 lbs.)	50.	10.	45.
Soy beans or field peas .	(10000 lbs.)	50.	15.	60.

An old orchard which has been neglected for a long time should receive a pretty liberal application of fertilizer when it is first renovated. There are many such old orchards in different parts of the state which, if properly pruned, scraped, sprayed, and fertilized, would give remarkable returns. A suitable fertilizer for such a condition would be about as follows:

600 to 800 pounds basic slag phosphate,
300 " high grade sulphate of potash,
300 " nitrate of soda.

The soil in such an orchard should be plowed and an application of from 1200 to 1500 pounds of agricultural lime should be made to the rough furrow and thoroughly wheel-harrowed in. In early spring, the basic slag phosphate, the sulphate of potash, and 150 pounds of the nitrate of soda may be applied. The remaining 150 pounds of nitrate of soda can best be applied after the petals have fallen. This fertilizer formula may be reduced somewhat after the first year's application. About

500 pounds basic slag phosphate,
200 pounds sulphate of potash,
200 pounds nitrate of soda,

will usually be found a sufficient fertilizer application.

It is sometimes necessary to fertilize an individual tree which is

growing outside of a block of orchard. The following data may be used in this connection:

Determine the diameter of the top of the tree plus about two yards. Figure the square yards in this area. For every square yard of surface apply:

2 ounces basic slag phosphate,
1¼ " nitrate of soda,
1 " high grade sulphate of potash.

ESTABLISHING AN ORCHARD.

By R. W. Rees.

One of the first steps in establishing an orchard is the preparation of the land. The methods to be employed will of course vary greatly with the previous treatment the soil has received. If the land has been in hay or sod for some time, fall plowing is always preferable provided the site is not so steep as to cause washing from late autumn and early spring rains. There are two systems of fall plowing. One is to plow as shallow as possible, allowing the sod to decay during the winter and following by a deep plowing in the spring so that the partially decomposed sod will be turned well under where it will not bother with surface cultivation. The other system is to plow at a good depth in the fall and to omit spring plowing but work the land down with the disk harrow. If this system is followed the disking should be in the direction of the furrows as cross disking will turn up many sods and give trouble in subsequent cultivation.

If the land has been in a cultivated crop it may be plowed in the spring as early as condition of the soil will permit and should be harrowed and fined as for corn or other cultivated crops. A little extra labor spent in proper preparation of the soil is money well invested. It is much easier to cultivate the soil thoroughly where the tree is to be planted than it is to cultivate near the tree after it has been set. If the orchard site is worked down with the planker

for a finishing course it will leave the surface soil in excellent condition for staking out.

It is sometimes advisable to plant rough steep land to apples, and in such cases it is usually not the intention to use a cultural system. The preparation of such land would of course vary from that where land is to be cultivated or run to a good system of sod culture. On rough steep land the important features are to see that all brush is cut off, that stumps are removed from the places where the trees are to be planted, to look after the removal of stones and bowlders if they come at the point where a tree should be planted. This system is not to be advised for the average orchardist, but there are certain conditions under which it is permissible. A number of men have succeeded with this type of planting, but for every one who has succeeded a number have failed. In order to keep up a good soil fertility and sufficient moisture supply to mature a crop of first-class apples under this system, the orchard operating expenses will be greater than under a system of sod culture, or clean cultivation on land which is not so rough.

Types of Trees for Planting.

It is usually best to buy trees of local nurserymen provided you can secure good vigorous well-grown trees of the varieties you desire. If you do not buy of a local nurseryman, it is considered best to buy from a locality where climatic conditions are as similar as possible to those in the district where you are establishing the orchard. It is a good plan to send for sample trees before placing your order. Save these trees and see that those delivered come up to the sample submitted. Orders should be placed early — by the first of January at least, if the planting is to be done in the spring.

There has been a considerable amount of discussion as to the comparative merits of one and two-year-old trees. There are several objections to the two-year-old tree. In the first place it is usually poorly headed, that is, the branches come out very near together forming what we call a close head. From most nurserymen it is impossible to obtain trees which have been headed as low as is most desirable for the commercial plantation. In packing two-year-old trees very frequently many branches are broken or

bruised in the bales, thereby rendering them valueless and making it impossible to form a perfect head during the first year or two of growth.

The advantages of the one-year-old tree are that it can be headed to any desired height, and usually has a root system more nearly intact than that to be secured on two-year-old stock. After a three or four years' growth, a one-year tree will usually be fully as large and more perfectly developed than the average two-year-old tree planted in the orchard for the same length of time.

In buying trees, pay particular attention to a good spreading root system; buy those of medium height but of thick caliber and stocky. Always avoid the tall, slender, willow-like tree.

Upon the arrival, the bundles of trees should be broken and the trees heeled in a moist but well-drained soil, paying particular attention to see that the soil is firmed well about the roots so that there will be no danger of shrivelling of the trees from lack of moisture.

There has been considerable discussion as to the proper distance of planting, but it is usually conceded that for our standard varieties, such as Baldwin, and especially Rhode Island Greening, 40 by 40 feet is not too far apart. For the slower, less vigorous growers, as the McIntosh, this distance might be reduced 4 to 6 feet. It is a common practice to plant the permanent trees 40 by 40 feet, filling in the space with early-bearing varieties, such as Wealthy, Wagener, Oldenburg, or Yellow Transparent. Where this filler system is used we have the trees 20 by 20 feet. When they begin to crowd, the alternate trees should be taken out, leaving the rest on a diagonal with the trees approximately 27½ feet apart. They will be allowed to stand in this formation for ten or fifteen years longer, at which time the remaining filler trees should be removed, leaving our permanent planting 40 by 40 feet.

Systems of Staking Out.

The hexagonal system, or one in which the trees are planted in series of seven, six trees forming a hexagon with the other in the center, is a system used in certain Western districts. With this system we get 128 trees to the acre where trees are planted 20 by

20 feet, while in the square system trees planted 20 by 20 feet will give but 107 trees to the acre. This sometimes causes people to use the hexagonal system, but the mere fact of getting more trees to the acre does not mean very much for even with the trees 20 by 20 feet on the square the root systems will before many years fill the entire surface strata of soil. The hexagonal system is not as well adapted to the filler methods as the square, and therefore is not in as great favor in New England.

In the square system trees are put out in squares of 20 by 20 feet. The Munson system of staking is probably the most generally used. In establishing this system the base line is established along one side of the field and stakes set every twenty feet on this line. A perpendicular line is laid out from this at either end or at the center. A person can easily erect a perpendicular by the use of a triangle 12 by 16 by 20 feet. The perpendicular also has the stakes set every twenty feet. It is then necessary to use measuring boards for establishing points for the other trees. Material 1 by 3 inches, 20 feet in length, makes good measuring boards. These should be bolted together with a single bolt at one end so that the two will shut up like a jack-knife. By putting the loose end of one of these parts against the stake in the base line and the end of the other part on the first stake in the perpendicular line, the point where the two are bolted together will give the location of the next tree. By carrying this system right on across the field you will locate all the trees.

Laths make very satisfactory stakes for this use. The laths may be sawed so there will be three stakes to each lath.

The next operation is the use of the planting board. This is a board about four feet in length with a notch in the center and one at each end. The center notch is placed about the stake, and stakes are then placed in the notches at either end of the board. The center stake and board may be removed and a hole dug for the tree. Then in planting, if the board is again placed with the end notches over the two stakes, the center notch will be at the exact place for the tree, whereby we get a perfect alignment.

On a loose porous soil the holes need not be very much larger than necessary to hold the root systems without cramping, as the new roots will grow readily into the undisturbed soil. If the soil

is heavy the holes should be of greater size so that when the root system begins growth it will have plenty of loose soil in which to make a good start. Root systems should be well spread in the holes and the holes filled with surface soil. Great care should always be used to see that this soil is packed down thoroughly about the roots. The soil should be well packed until the hole is filled within three inches of the surface, and from there up loose soil may be filled in and left as a soil mulch. It is better to plant the trees about two inches deeper than in the nursery row. This will cover up the crown or crooks in the trees if any exist.

Many questions are always asked concerning the use of dynamite in the establishment of the orchard. It will depend pretty largely on soil types as to whether or not there is anything to be gained from its use. If the subsoil is porous the roots will find their way readily through it and very little is gained from the use of the powder. If, on the other hand, the subsoil is somewhat compact, by the use of dynamite it will be loosened and the roots will be able to make a more rapid growth the first year or two, thereby forcing out a better wood growth on the tops and branches.

FACTORS THAT INFLUENCE QUALITY IN APPLES.

By Dr. J. K. Shaw.

One of the prominent characteristics of the recent development of the apple industry is the appreciation of high quality on the part of the producer and the consumer alike. People are ready to believe that the New England grown apple is superior in quality to those grown in any other part of the world and this may well be true. At any rate it is worth while to consider the production and the recognition of quality. Not all will agree on which are the best apples, yet it is possible to lay down certain principles that most people will assent to if they understand them. Let us first consider some of the factors upon which quality depends.

Color and appearance. While the outside appearance of an apple does not enter into quality directly, it should be noted on account of its indication of the condition of the interior of the fruit. As between varieties color and appearance have little significance. Some unattractive sorts are of the highest quality while some handsome ones are worthless. On the other hand, within a given variety the external appearance may have considerable value in indicating the quality of the fruit. As a general rule a handsome Baldwin is likely to be a good Baldwin and an unattractive one will be found to be of poorer quality. It should be said here that one must understand the meaning of appearance of an apple in order to judge its quality.

Texture. This has considerable influence in determining the quality of an apple. Some apples are coarse, dry, or mealy in texture while others are fine, smooth, and juicy. Most people will prefer a smooth melting, juicy apple but some like them to be crisp or breaking in texture. Perhaps the McIntosh represents the finest texture but some may prefer the firmer, crisper texture of varieties like the Yellow Newtown.

Sugars and Acid. Apples contain from about 8 to 12% of sugars, the amount depending on the variety and condition of the fruit.

Winter varieties have more than summer ones and one that in prime eating condition is likely to have more than one either unripe or over ripe. From less than one-fourth to nearly one-half of these sugars may be cane sugar which we are all familiar with, and the remainder consists of a mixture of dextrose and levulose, sometimes spoken of as glucose. It is mainly a mixture of these sugars that we buy in corn syrup. Sugars lend richness to the fruit and cane sugar is of more value in this respect than glucose. The amount of sugars in apples changes from day to day according to the conditions under which the fruit is kept. In general, the more sugars in the apple the better the quality. The acid of apples is malic acid, a perfectly harmless vegetable acid. There may be found from one-tenth to three-fourths per cent or more in ripe apples. Sweet apples have usually less than one-fourth of one per cent and it is the lack of acid and not an excess of sugars that makes an apple sweet. Tolman Sweet apples usually contain less sugars than Rhode Island Greenings. It is the relative amounts of acid and sugars that make for high quality rather than the absolute amounts of either. A moderate amount of each yields higher quality than an abundance of one and a moderate amount of the other. The most agreeable relation of acid and sugars is largely a matter of personal preference, some liking a mild or even sweet apple while others prefer quite sour fruit.

Essential oils. These are what contribute the distinctive flavor and aroma to the different varieties. They exist in only very minute quantities and may be detected by the chemist only with very great difficulty if at all. An abundance of pleasing flavoring oils supply the utmost refinement to good quality and are therefore of greatest importance in the best of fancy table apples. McIntosh and King are two varieties that rank very high in flavoring oils and most people will prefer them largely on this account.

Apples are used for two purposes, dessert and cooking, and it has been a common practice to classify varieties under these two heads but there are many sorts that take high rank in both classes. In general it may be said that the requirements for a good cooking apple are less exacting than those for a good dessert apple. We like to see an apple of attractive appearance on the table, one that is bright red, but this is of little account in cooking apples. A

coarse texture is broken down in the cooking process but many like an apple that keeps its form fairly well when cooked. A deficiency in sugars is readily made up by adding sugar to the cooked product thereby adding to its richness, while a deficiency in acid is not commonly supplied though perhaps it might be by the addition of citric acid, the acid of oranges and lemons. Flavoring oils are of great value in cooking and table apples alike.

Having discussed the factors that go to make up high quality in kitchen and dessert apples we are now ready to take up the several things that may influence these factors of quality. The first and perhaps most important thing is the variety. Some kinds of apples are good and some are not, no matter how well grown and handled. There are many hundred varieties of apples and it is impossible to name them all and assign them their value in the scale of quality even if all would agree with the rating. The high-quality varieties are those with a tender, melting, juicy flesh, rich with a pleasant acid and an abundance of agreeable flavoring oils. Most of the best known varieties are red but there are many green or yellow ones that are of the highest rank. A few of these have become more or less well known in spite of their handicap of a lack of a bright red skin. Yellow Newtown is perhaps best known of any yellow table apple and the Rhode Island Greening among the cooking varieties. Other excellent sorts are Grimes, Roxbury Russet, and Porter, while the Palmer Greening is worthy of becoming the Yellow Newtown of New England. The Newtown and Grimes are not at their best with us.

Among the red apples perhaps the McIntosh and Tompkins King should be assigned first place among varieties of high quality. They are closely followed by Northern Spy, Gravenstein, Williams, Wagener, and a host of others. The Baldwin is not ordinarily classed among the very best but, when well grown and properly handled there are few that can beat it as a steady thing week after week and year after year. Among the excellent red varieties that come to us from other parts of the country are Jonathan, Esopus Spitzenburg, Winesap, and Stayman Winesap. All of these with the possible exception of Williams and Jonathan are excellent for cooking as well as for the dessert.

The best of varieties are not always as good as they should be

and one of the reasons is the conditions under which the apples are grown. A tree that is starved or has unhealthy foliage cannot produce apples up to the standard of the variety. Possibly too much vigor in the tree may be unfavorable to the production of the best fruit. The quality of a variety may be much modified by the soil in which it is grown and we must fit varieties to soils in order to grow them at their best. Climate, too, has great influence on the quality of varieties. Grimes, Esopus, Jonathan, and Winesap, mentioned above, are excellent when grown in climates adapted to them but with us in New England they are only medium or even poor in quality. There is always a tendency for well-known commercial varieties to spread to sections of the country to which they are ill adapted and as a result of this their reputation for quality suffers. Baldwin is an illustration of this. Well grown in suitable soils in southern New Hampshire and Massachusetts it is very good but it has been carried too far to the north and into unfavorable soils and under these conditions the quality suffers. Bad storage conditions may injure the quality of a variety; strong smelling vegetables or any disagreeable odor in the storage cellar may injure the flavor. In order to be at its best any variety must be grown in a soil and climate suited to it and given the best of care both while growing in the orchard and while in storage ripening and waiting for the consumer.

All apples go through a definite order of growth, ripening, and physiological decay and at a certain stage of the ripening process they are at their best, therefore the stage of maturity has much to do with good quality. The rate of progress depends principally on the temperature to which the apples are subject. Much of the inferiority sometimes found in western apples is due simply to the fact that they are over ripe and of the Baldwins from northern New England to their immaturity. The selection of a choice apple is based largely upon the recognition of the proper stage of maturity. This may be made upon the color and appearance of the apple. It attains its best quality when the appearance is most attractive but it may retain this until it is past its prime. In judging maturity one should go by the yellowish-green ground color more than by the overlying red. When this is at its brightest and most pleasing yellow and before it begins to grow dull the apple

is good. The development of this yellowish color livens up the reds and makes them more attractive. The texture also changes with maturity. In the green apple it is firm and crisp; it gradually mellows and finally acquires a dry and mealy taste. This mealy taste arises from the fact that the outside layers of the individual cells soften with over maturity and allow the individual cells to separate in the mouth so that one gets the taste, or rather the tastelessness, of the cellulose walls instead of the rich, pleasant juices contained within the cell which would be obtained if the walls were more generally ruptured as occurs when the apple is at its best stage of maturity. The "dry" apple may contain more water that the juicy one.

The sugars gradually increase with the development of the apple until the highest quality is reached, or perhaps a little later and then they slowly disappear. The acid is high in the immature apple and it gradually decreases with ripening until finally in the over-ripe apples it has decreased so much as to leave the apple flat and insipid. Obviously the most desirable stage so far as the sugars and acid is concerned is when the sugars have reached about the maximum and the acid has decreased to the point that gives the most agreeable blend of the two.

The essential oils increase with ripening even after the fruit is in storage and then gradually decrease and it is probably a change in these oils that gives the bitter flavor occasionally found in highly flavored apples when they are much over mature. In well-grown and properly cared for fruit they reach their maximum about with the most desirable texture and blend of acid and sugars.

SOME COMMON ORCHARD PESTS.

By Prof. W. W. Chenoweth.

A knowledge of the habits and life history of the various pests which beset the way of the fruit grower enables him to exercise an intelligent control of any particular pest. He knows not only when to attack it but how and why. Methods of control are determined by the nature of the pest and not infrequently are they more easily combatted in some one stage of their life than in any other. This knowledge acted upon would in most cases prevent any serious loss.

Orchard pests are very readily separated into two classes, viz., diseases and insects. Diseases are the result of parasitic plants known as fungi and bacteria. These parasites may attack the whole plant, or they may confine their activities to some certain part, or their greatest damage may be done to the fruit. Some may be controlled by spraying, others are not.

The insect pests may readily be grouped into two classes; those that chew their food and those that suck. The chewing insects are most easily controlled by spraying upon their food some arsenical poison while those that suck their food must be treated to a corrosive spray or one that will spread a film over the body causing its death by suffocation.

Many insects pass through a number of well-defined stages in their development. The adults of many lay eggs and these hatch into a worm-like creature, the larva, commonly called worm, grub, borer, or caterpillar. This is the stage in which as a rule the greatest damage is done as the larvae are voracious feeders. Soon these worm-like creatures go into a resting stage which continues for some days or weeks. It is now called a pupa. From the pupa there eventually issues the adult, thus completing the life cycle. Some few as the San José scale give birth to living young. Others as various plant lice pass the winter in the egg stage, but during the spring and summer months give birth to living young.

In many cases then the control of our insect pests is determined by the habits of the insect.

Diseases.

Apple Scab. This is the most common of the fungous diseases and no doubt causes more damage than any other one. Certain varieties as McIntosh and Fameuse are very susceptible and often the whole crop is lost if proper measures are not used.

The disease appears first on leaves, later on blossom stems and fruit. The leaves assume a velvety olivaceous appearance, often becoming distorted and falling in early season. If the disease attacks the young flower stems or setting fruit much of it too will drop. When the disease develops on the fruit it forms an olive-colored spot with silvery edges. Soon the fruit cracks, if "scab" is bad, rendering it worthless.

In orchards known to be affected with this disease spraying with lime-sulphur just after leaves expand, but before the buds open, and again just after fall of petals will be found to give a fair degree of control. Though quite often if season is cool and cloudy another spraying three weeks following the last mentioned above will be found necessary.

Fire Blight. This disease, known also as twig blight and pear blight, is caused by a bacterium which infests the cambium, i. e. the layer just beneath the bark. The fruit spurs, twigs, branches, and occasionally the trunk of the tree are affected. The disease operates about as follows: Usually a short time following blossoming the leaves on fruiting parts and the young shoots begin to turn brown or black. The wood dies but generally the blackened leaves hang tenaciously to dead twigs. If disease is serious much injury may result, often large branches and occasionally whole trees die in a single season. The progress of the disease down the twig or branch can generally be traced quite readily as the dried shrunken bark shows distinctly in contrast to the live bark below. However, it is safe to assume that the disease germs have progressed several inches below this area. The disease lives through the winter in what are known as "hold over cankers." In the spring when growth begins there exudes from these cankers a sweetish fluid teeming with the bacteria. Bees and other insects visit these places and carry the bacteria to the flowers. Here in the nectar of the flowers the bacteria multiply rapidly, and each infected flower in turn becomes a seat of infection. From the flower the

bacteria enter fruit spur or twig, while plant lice and other insects are held responsible for introducing them into the growing shoots.

Since this disease operates beneath the surface spraying is useless. The only remedy known is to prune out and burn all diseased portions using great care to cut low enough to remove all diseased wood and as a further precaution against spreading the disease each wound should be sterilized with mercuric chloride, formalin, or some good antiseptic. Much of the infection might be avoided if all cankers (dead, sunken areas in bark) were found and carefully pruned out.

Black Knot. This disease attacks the plum and cherry trees. It is conspicuous because of the black warty knots on the twigs and branches. This diseased condition is due to a fungus living in the bark and cambium. These knots are the seat of infection as spores are produced here in early season and are readily borne to unaffected parts by the wind. Here as in the case of fire blight the disease is within and cannot be reached by spraying. Though experiments have shown that Bordeaux sprayed on at swelling of the buds has greatly lessened the spread of the disease, the only reliable remedy seems to be to prune out all diseased parts (the knots) and burn. If allowed to go unchecked much injury results.

Canker. There are a number of diseases of apple and pear which during all or a part of their life cycle, live beneath the bark causing roughened dark areas known as cankers. The one most common throughout New England is the European canker. This disease is to be found in nearly all neglected trees and quite often in young trees. In most all cases these various diseases depend upon wounds for entrance into tree. The European canker attacks the bark, cambium, and to some extent the wood. As the new growth develops around the wound it is attacked and killed by the fungus and in this way a series of ridges develop giving a characteristic appearance. Spores are produced in spring and summer and through these new infection takes place. The remedy is to prune out and burn all branches affected. Large cankers on main branches and body of tree may be cut out and wounds coated with Bordeaux or paint.

Brown Rot. Brown rot or ripe rot as it is often called attacks the peach, plum, and cherry any time after half grown, but is worse

just before or at ripening time causing them to rot. Many of the fruits shrivel up and produce the mummies often seen hanging on trees throughout winter and spring. It is particularly prevalent during moist seasons. This disease is very closely allied with the curculio, especially in case of the peach and plum. The unbroken skin of the fruit is ample protection against this disease, but if curculio and other insects which puncture the fruit are prevalent then the disease finds ready entrance. This disease is spread by means of spores which are formed on the mummied fruits and from cankers on the trees.

Remedy. Destroy or plow under all mummies; prune out any cankers that may be present; spray (1) with lead arsenate at time of shedding the calyx; (2) two to four weeks later with self-boiled lime-sulphur and lead arsenate; (3) about one month before fruit ripens using self-boiled lime-sulphur. Plums and cherries may be sprayed later as the lime-sulphur washes from them more readily than from peaches.

Peach Leaf Curl. This disease attacks the leaves, young shoots, flowers, and fruit of the peach. It is characterized by a curling or arching of the leaf blade becoming much thickened and crumpled along midrib. Later in season diseased leaves may fall leaving tree bare. The shoots become enlarged often attaining more than twice their normal size.

The disease is produced by a fungus which develops best during a cool damp spring. Infection takes place just at the opening of the buds. Spraying with a fungicide as lime-sulphur just before buds open will prevent entrance of disease. If spraying is delayed until leaves begin to show it will be too late as the disease has already gained entrance and is therefore safe from any spray that might be applied.

Insects.

The Codling Moth. This is the insect that gives us the "wormy" apples. Losses estimated at millions of dollars are attributed to this one pest alone. The annual loss due to codling moth in New York is estimated to be between two and three million dollars.

The adult moth deposits its eggs on the leaves, fruit, or branches usually two to three weeks following the fall of the petals. The egg

hatches within a few days and the young larva soon finds its way to the calyx end of the fruit. If the egg was deposited upon the apple the first meal is taken from the sheltered cavity beneath the closed calyx lobes. More than 75% of these "worms" enter the apple at this place. Quite often where two fruits touch the entrance is made at this point. Eating its way into the apple the worm feeds upon the core and surrounding pulp. After a period varying from 20 to 30 days it tunnels out, finds a hiding place usually under the bark of the tree and changes to a pupa. Here it may spend three weeks when it emerges as an adult ready to begin the life cycle again. In many sections there are two broods each year, but here there is only a partial second brood, only the very earliest eggs developing into the adult moth. As a rule the pupa state continues until the following spring.

Since the large number enter through the calyx this offers the surest way of combating them. If more than 75% of the newly-hatched larvae take their first meal in the calyx cup it naturally follows that if we can get some poison into this cup the first meal will also be the last one. For a week or ten days subsequent to the falling of the petals the calyx lobes are standing wide apart. However, after a lapse of this time these lobes close down practically closing the cavity beneath. In order then to get poison into this cup the trees must be sprayed within a week or ten days following fall of petals. Lead arsenate is most effective and is used at the rate of 3 pounds of the paste to 50 gallons of water. Thorough spraying done at the right time will reduce codling moth injury to a minimum.

San José Scale. The extreme small size, its marvelous powers of reproduction, its protection by a scale covering, and its large variety of food plants all combine to make this one of the careless orchardists' most deadly pests. It lives upon the surface of the bark to which it gives an ashen-grey appearance and upon the fruit where it produces its characteristic pink or red spots, thus injuring the appearance and greatly reducing the market value of the fruit.

The approach of severe winter destroys practically all the mature and the very young scales, leaving the half-grown insects to pass through the winter. When growth begins in spring these half-

grown insects grow rapidly and soon begin to propagate and so rapid is their propagation that one female might in a single season easily become the ancestor of more than one billion offspring. Insects, birds, and the wind are the chief agents in distributing this pest throughout the orchard. The young spend the first few hours after their birth in crawling around seeking some congenial place to settle down. It is during this stage that they are blown about or carried by birds and flying insects. Nursery stock is often responsible for introducing this pest into uninfested localities. Fruit bearing the scales is also accredited with assisting in the dissemination.

Since the insect itself is so completely protected by its armor the only effective campaign for its extermination can be carried on during the dormant season as sprays strong enough to penetrate the scale would prove destructive to the foliage. In a badly infested orchard spraying with soluble oils, 1 to 12, in late autumn or early winter and again in the early spring with a strong solution of lime-sulphur, 1 to 10, is recommended. The spraying should be thorough; look out especially for the tips of the branches for if a few places on each tree are left uncovered they become a breeding place and a center for distribution of the pest the following summer.

Curculio. This insect is now regarded as among the most destructive of our orchard pests. It is responsible for many of our knotty, misshapen apples pears and quinces, for our wormy plums and peaches, also for many of the wormy cherries. The adults appear early in the spring from their hiding places and feed for a time upon the foliage. When the young fruit sets they then turn their attention to it. They not only feed upon the fruit but also lay their eggs in it. The egg is deposited in a hole made in the fruit and a crescent shaped cut is made near this hole. If the egg hatches a "wormy" fruit results. If the egg does not hatch an undeveloped fruit generally results. Also it has been shown conclusively that the many punctures in the fruit made by these insects is very largely responsible for the spread of the brown rot in the peach, plum, and cherry.

The only practical methods of control at present consist in destroying all drops, keeping the rubbish out of the plantation, thus reducing the chances for hibernation of adults, and in spraying

with arsenate of lead as soon as foliage appears and again after fall of petals. The purpose of these sprays is to keep the foliage and young fruits, the insects' food, covered with poison.

Apple Maggot or Railroad Worm. The adult of this pest is a fly. Its eggs are laid just under the skin of the apple beginning usually in July and continuing until September. The eggs hatch into legless grubs which tunnel about through the apple. The earlier tunnels become healed but hardened, while the later ones remain open and turn brown. The fruit is practically worthless. This insect is an exceedingly difficult one to combat. The only practical method in the past has been to destroy all infested fruit. However, quite recently experiments have been made in the use of sweetened spray for both this and the cherry fruit fly. This treatment consists of a spray of lead arsenate sweetened by addition of molasses and applied to foliage at the time the adults make their appearance in the orchards. It is possible that this may prove a ready means of controlling this pest.

Tent Caterpillar. This pest is particularly conspicuous because of its web or tent and because of the destruction of the foliage. The eggs are laid in a large mass firmly fixed to a twig and well covered over with a dirty brownish gelatinous substance. These eggs hatch in early spring as soon as foliage starts and the caterpillars coming from a single egg cluster remain together as a colony. A tiny web tent is formed on the branch or at the crotch of two twigs and as they increase in size the tent is enlarged until it becomes very conspicuous. During nights, cool days, or rainy spells the colony retires to the tent and advantage is taken of this habit to burn out the nest as it is often called. In orchards receiving the dormant spraying this pest is seldom of any importance as the oil or lime-sulphur will destroy all egg masses that are thereby covered with the spray material. Lead arsenate applied to infested branches readily controls them. It is necessary to spray only the tree affected.

THE SPRAYING CAMPAIGN.

By R. W. Rees.

In taking up this subject let us first consider some of the sprays which are in common use in controlling our insect pests and fungous diseases.

Lime-Sulphur.

Lime-sulphur as a spray was discovered by accident. Originally a combination of lime, sulphur, sugar, and salt was used as a sheep dip. A Western rancher after dipping his sheep in this solution applied some of it to a tree which was infected with San José scale. He found that it killed the scale, and through this chance experiment has been developed our present commercial lime-sulphur which now does not contain either the sugar or the salt. Commercial lime-sulphur is an amber-colored liquid and should have a density of 30 to 33 degrees on the Beaume scale.

Lime-sulphur is used as a contact insecticide for such pests as the scales, and as a fungicide for apple scab. It is the most largely used, and without doubt is the most effective general "cleaning up" spray we have.

Self-boiled lime-sulphur is very different material from our commercial lime-sulphur as the self-boiled is merely a mechanical mixture and not a chemical combination. Self-boiled lime-sulphur is made by placing 17 pounds of good grade live lime in a cask and putting over this 17 pounds of flowers of sulphur and adding 6 or 8 gallons of water. It is well to cover the cask so as to hold in the steam while the material is cooking by the heat generated by the slaking lime. It should be allowed to cook for about twenty minutes and then be diluted to 50 gallons, when it is ready to be strained and applied to the trees. The formula will vary anywhere from 10–10–50 to 20–20–50, but the 17–17–50 just given has proved most satisfactory in our work.

Soluble sulphur is a comparatively new preparation on the market

and while it has given very good success where tried we believe it best to be a little cautious about giving it a general recommendation. We will say, however, that it has proved satisfactory with us as a dormant spray, but where used as a summer spray on peaches it caused considerable injury to the foliage. Where used in combination with arsenate of lead on apple trees for codling moth spray it also gave more or less trouble. We do not believe that it is a spray suitable for summer use, either alone or in combination with the lead.

Miscible Oil.

Miscible oils are made up of a petroleum base so treated that it will readily mix with water. It has been used quite largely as a spray for scale. Most brands are somewhat more expensive than lime-sulphur, but it is possible to do more thorough work, especially on rough bark and tall trees, as the oil is much more penetrating and spreads more readily than the lime-sulphur.

In one or two states there has been considerable complaint of damage to trees from the use of oil. I have never seen any damage to apple wood caused by oil and cannot positively say that I have seen peach trees that have been damaged by oil, but have seen trees on which the wood was in poor condition and circumstantial evidence pointed strongly to oil as the cause. If a good grade of oil is used and directions are followed there should be no damage to the trees sprayed.

On tall apple trees or those badly infested with scale oil is to be recommended as the best spray because it is very effective and is easy to apply.

Bordeaux Mixture.

Bordeaux mixture had its origin in the Province of Bordeaux, France, where it was first used as a fungicide in combating mildew of grapes. For orchard use it is made up of 4 pounds of lime and 4 pounds copper sulphate to 50 gallons of water. It has fallen into disrepute among apple growers as a spray for apple scab on account of damage to fruit in the form of russeting if the weather is damp and cold at the time of application.

During the past year there has been a considerable amount of trouble from burning foliage, and in certain cases damage to fruit, by a combination of arsenate of lead and lime-sulphur. For this reason there is somewhat of a tendency to return to the use of bordeaux as a fungus control. It is probable that some of the forms of bordeaux and lead combination would be as satisfactory as anything for this particular spray.

Arsenate of Lead.

Arsenate of lead is practically the only stomach poison now used in apple spray work. We have arsenate of lead in two forms, paste and powder, the paste form being by far the most widely used. The paste arsenate of lead is quite uniform in strength and when used alone practically never causes damage to foliage. There is more or less trouble in getting it into suspension in the water. Great care must be exercised to see that it is well mixed before being applied to the trees and a good agitation should be kept up while the liquid is being sprayed from the tank so that there will be no settling of the materials. The powder form is somewhat more expensive but in a number of the most progressive apple districts it is meeting with great favor. It is very easy to get into suspension and stays in suspension better than does the paste. From this saving of time many growers think that it is cheaper than the paste form.

Tobacco Sprays.

A number of tobacco sprays are to be found on the market. Their chief use is in the controlling of soft-bodied insects such as the aphis or plant lice. These sprays kill entirely by contact and though very effective never give trouble by foliage burning.

Black leaf 40, which is in reality a solution of nicotine, is probably the most popular and widely used type of tobacco spray.

Whale Oil Soap.

Whale oil soap is also used as a contact spray for soft-bodied insects. The greatest objection to this soap is that it is not uniform in strength and sometimes causes damage to the foliage, also

that it is extremely hard to dissolve in water. When using whale oil soap it should be cut up finely and dissolved in boiling water. Then it may be diluted to one pound to six or seven gallons of water.

Spraying Apparatus.

We have four general classes of sprayers, the bucket pump, knapsack sprayer, barrel pumps, and the power outfits.

The bucket pump is a small cylindrical pump which may be attached to any ordinary bucket and is of service in a home garden on currant bushes or cane fruits, or for spraying two or three small trees on a suburban lot, but is not satisfactory for commercial purposes. Very frequently commercial orchardists keep one or two bucket pumps for use on local troubles, as in controlling aphis in case it is found on one or two trees, thus making it unnecessary to take out a heavier outfit.

The knapsack sprayer is somewhat more expensive and in most cases less effective. It usually has a capacity of five or six gallons and is carried about on one's back while at work. One of the principal objections to a knapsack is that most of them leak and it is rather hard on a man's Christian fortitude to continue work with spray dripping down his back. The knapsack sprayer is not capable of producing high enough pressure to reach trees of any height, its work being limited entirely to shrubs and the home garden.

Barrel Pumps. There are two general types of barrel pumps, one in which the pump is mounted on the end of the barrel, and one in which it is mounted on the side. It makes comparatively little difference which type of sprayer is selected so far as effective work is concerned. The side mount is probably a little more satisfactory on rough hillside land as there is less danger from tipping of the barrel. But whatever type of barrel pump is selected, be sure that all the working parts are of brass, that the valves are of some non-corroding material and easily accessible, and that the pump is in every way as simple as possible. A complicated spray pump is never satisfactory.

Accessories.

Hose. The type of hose which a person will use will of course vary somewhat with the type of work one is doing, but for general spray work a good five-ply grade of three-eighths inch hose will be found the most satisfactory. A three-eighths inch hose will carry all the spray which can be discharged through two nozzles. Owing to the lighter weight which is necessary to drag about the ground the wear on the smaller hose will be less than it would be on a larger one. A five-ply hose, as mentioned before, is best when a person is willing to take care of his spraying apparatus. The hose should always be rinsed out carefully after each day's work. If left covered with spray materials, either the oils or lime-sulphur, the best grades of rubber hose will not last better than a cheap grade of cotton.

Extension Rods. A good bamboo extension rod with a brass or aluminum inner casing is by far the most satisfactory to use if a person is careful in handling it, but these rods will not stand the rough handling and abuse that is possible with a heavier gas-pipe rod. If an iron gas pipe is to be used it should be cased with wood for three or four feet at the lower end so that a man may obtain a good grip. Otherwise there will be more or less trouble from cramped hands.

Nozzles. There are three general types of nozzles. The large disc type is one with a large chamber where the spray enters in a whirling motion and is thrown out from a comparatively large bore but owing to the circular motion within the chamber forms a fine cone spray. This is one of the best general types of nozzles insomuch as it may be obtained in the forty-five degree angle style, also that it does not have any projections which will catch on the branches.

The Vermorel type of nozzle is one with a comparatively small spray chamber and a small opening. The spray is driven out under pressure and forms a fine mist merely by being forced through a small opening. This type is satisfactory with oils and with carefully strained sprays of other nature, but it has given more trouble from clogging, and also has projections which sometimes catch on the branches.

The Bordeaux nozzle is one which is particularly adapted to long distance spraying for if the nozzle is opened up wide a coarse driving spray may be thrown at great distance. This may be adjusted by turning the barrel of the nozzle so that the opening crosses a knife-edge which thereby forms a fan-shaped spray much finer in composition.

The Bordeaux and Friend types will answer practically all our purposes and in most cases will prove more satisfactory than the more complicated types.

It might be well to say a few words in regard to the general principles of spraying. We hear a great deal as to the relative merits of high and low pressure, fine and coarse sprays. In a general way a medium high pressure and a comparatively fine spray give the best results, but thoroughness in application is of greater importance than the size of nozzle or the height of pressure. If we know the insect pests or fungous diseases which we are trying to combat, if we use the spray materials which have proven most satisfactory for their control and make thorough applications, the work as a rule will be satisfactory.

SOIL MANAGEMENT IN THE ORCHARD.

By R. W. Rees.

The subject of soil management is one on which we have many conflicting opinions even among our most progressive and most successful commercial apple growers. The diversity of opinion lies partly in the wide range of soil types which they are handling, and partly in the systems of pruning and fertilizing which they are conducting.

For a short time let us consider systems of cultivation and the benefits to be derived therefrom. We would not think of growing annual crops, like corn or potatoes, without practicing some cultural system to keep up the physical condition, conserve moisture, and assist in freeing plant food. If it is important on annual crops, is it not logical to believe it must be of fully as great importance on crops which are to occupy the land for a period of fifty or seventy-five years? Cultivation improves the physical condition of the soil by reducing the extremes of temperature and moisture, and by firming and drying the soil early in the spring. It aids in the chemical activities of the soil by hastening decomposition of organic matter and aiding in freeing plant food. Certain classes of insect pests are controlled to a greater or less degree by the use of cultural methods, thereby destroying places for them to harbor, or in some cases destroying their egg nests. Probably one of the greatest benefits to the soil from cultivation is that of conserving moisture. The moisture rises from the lower strata of the soil through very small capillary tubes and if the soil is compact to the surface the moisture will rise to the surface and then be carried away in the air through evaporation. Many of you no doubt have noticed during dry summer weather that if a large stone or heavy plank is removed the soil will be moist beneath it while it may be dry and baked nearby. The reason for this moisture under the stone or plank is that it has been brought to the surface

through capillary tubes, but has not been allowed to pass off by evaporation. If we have loose soil as a surface layer it will act similarly to the stone or wooden mulch, holding the moisture where the feeding roots of the trees are able to utilize it.

The effect of tillage on the trees is to give a slightly longer period for wood growth, to force a more vigorous growth early in the season so that the trees will have made a sufficient growth in time to mature the wood before the fall frosts. Tillage, by maintaining a good moisture supply, tends toward the formation of a larger number and more vigorous fruit buds for fruit the following year. It also makes it possible for the tree to produce a larger number of fruits of good size.

The principal objections to tillage are that when a tree is making heavy wood growth and carrying a large amount of foliage, we sometimes have trouble in securing a good color on the red varieties. This feature of the work will be discussed under another heading.

Implements for Tillage.

On all the heavier soils a plow is necessary every spring, and especially where cover crops are grown even on the lighter soils we usually secure better results by plowing than by the use of other cultural tools. If the soil is comparatively light and sandy and the cover crop has been of buckwheat or some type which does not live through the winter a disk harrow may be used to advantage in the spring and at a less expense than the plow. Whether plow or disk is used, it is usually best to follow with a spring tooth harrow, and the cultivations during the latter part of the season being with an acme harrow or a smoothing harrow. Almost any type of cultivator which will keep the soil stirred up in good condition and destroy the weeds will be satisfactory. Cultivation should always be started in the spring as soon as the soil is dry enough to work, and cultivations given every two weeks until about the 20th of July, when a cover crop may be sown and cultivation discontinued for the remainder of the season.

A number of growers are having very good results with systems of sod culture, especially where the grass is mowed two or three times during the season and allowed to lie under the trees as a

mulch. It must be remembered that if we are using the sod cultural system, and especially if the trees are in sod and the grass is cut for hay, that we are taking out a considerable amount of plant food as well as moisture. It is usually well, on an orchard which is in sod, to give it liberal dressings of stable manure to keep up fertility and a sufficient amount of organic matter. On very rich soils it is frequently advisable to seed down to allow the orchard to go in sod for two or three years to check up wood growth. On very heavy soils the same treatment is frequently desirable to improve the color and texture of the fruit. These are matters to be regulated by soil conditions and the judgment of the orchardist.

Associated Crops.

In producing the apple orchard there is a considerable expense attached for a number of years before the orchard comes into a profitable state. To assist in carrying this expense, associated crops are frequently grown between the trees. If good judgment is used in the selection of crops and in the systems of handling, the trees need not be damaged, but it must always be borne strictly in mind that fruit trees are the principal crop on the soil and that the inter-crops are secondary.

We want a crop the top of which will furnish shade to the soil, preferably one that will add fiber by its roots, and a type which will have the least interference with the trees. Most of the common garden and truck crops can be grown to greater or less advantage. Corn has probably been grown more than almost any other crop. It is pretty satisfactory, but if the larger types of corn are used they sometimes shade the trees too much and are really an injury to the orchard. Leguminous crops, such as beans or peas, are the very best provided they may be marketed to advantage. Potatoes are grown to a greater or less degree and are pretty satisfactory, the greatest trouble being that if the soil is heavily fertilized for potatoes they frequently will leave an excess of fertilizer in the soil, thereby forcing the trees in growth late in the season. The careful orchardist may grow cane and bush fruits to advantage, providing he is careful that they do not interfere with the trees. For the novice or amateur this is a dangerous practice as there is a

great tendency to allow these crops to remain in the orchard long after they should be removed, the trees suffering as a consequence.

It must be borne in mind that the roots of the young trees will extend out beyond the ends of the branches, also that the roots from associated crops will extend out some little distance from the plant rows, so that the first year the associated crops should be kept at least three feet from the trees and each year about a foot in distance should be added.

SOME PRINCIPLES OF PRUNING.

By Prof. W. W. Chenoweth.

Of all the orchard operations none is so full of interest as pruning. Through it we come into the most intimate relations with each individual plant and learn much concerning the habits of each variety and species. Pruning requires more knowledge, more experience, and more thought than any other orchard work and the fact still remains that we know much less about it.

The purposes of pruning are generally summed up under some half-dozen heads, but for our purposes here we will say that pruning is one of the means employed for securing more fruit, better fruit at a minimum cost. I should like to make a distinction between pruning and "trimming up." Too many Massachusetts apple trees have been trimmed up for so many years that they stand now with tall, gaunt, naked branches and trunk often twenty feet or more to the first fruit bearing branch, a living, crying monument to the ignorance or indifference of present or bygone owners. These trees are to be found throughout the state and are an example of what trimming up will do.

We may fertilize our trees by formula, we may spray by formula, we can even maintain cover crops and cultivation by formula, but we cannot prune by formula. Each species, each variety,

and among the tree fruits each tree is a law unto itself. Each tree presents a problem varying in complexity from every other tree. And while we may not lay down any "rule of thumb" whereby our plants may be pruned there are a few general principles which if known and applied with a liberal use of good common sense will enable one to do a fairly creditable job.

Perhaps the most important of these principles is the fruiting habit of the plant. The apple and the pear are much alike, each bearing the bulk of their crop on short crooked ragged growths known as fruit spurs. These fruit spurs live for years bearing annually or biennially. The fruit buds are as a rule terminal, hence the crooked growth of spur as each time a blossom is produced the direction of growth is changed. The pruning of these species should be of such nature as will best develop the fruit spurs and maintain their normal growth.

The peach bears all its fruit on wood of past season's growth. It has what might be called a progressive habit of bearing, the bearing wood being constantly carried higher in unpruned trees. Evidently then we should prune the peach so as to secure the desired amount of young growth each year not too far from body of tree. This requires more severe pruning than does the apple or pear.

Plums and cherries are quite similar in fruiting. Most of the fruit being born on spurs growing on wood two to four or five years old. In cherries particularly some fruit is born upon wood of past season's growth, while on plums only a very small part of crop is found on the shoots of past season's growth. The spurs on these species are relatively short lived, three to five years. Hence pruning will be more severe as a rule than the apple, but less severe than the peach.

The quince blossoms are born on the new growth coming from lateral buds of past season's growth. In all the other tree fruits discussed the fruit buds are formed the season preceding blossoming. These vary in their degree of development, but are nevertheless true fruit buds, while the quince does not produce any true fruit buds until the season of blossoming.

Grapes, blackberries, and raspberries do not form true fruit buds to pass through the dormant season. Buds are formed, however,

and these in the spring grow into branches which produce the flowers and fruit. It might be well to remember that the fruiting branches come from buds formed on wood of previous season's growth. Hence in pruning these we leave a sufficient number of buds on past season's growth to provide for this season's crop.

From this very brief discussion it will be seen that a man ignorant of fruiting habit of plants has no business trying to prune them.

Another principle it is well to bear in mind is the light relation. Neglected trees soon become so thick topped that lower branches and all small growth in interior of tree are shaded out. Light is necessary to the growth of leaves, and parts of trees kept in too dense shade die. This results in forcing all the bearing wood to the outside of the tree and thereby places the load fruit of too far from stem of tree. A judicious thinning out of the top will keep alive the lower branches also much fruiting wood in interior of tree. The crop will be large since there is more feeding surface to support growth, and besides it is better distributed through the tree. If thinned sufficiently the fruit in interior spurs will not be of low color.

Another principle we must consider is the relation between growth and fruiting. Each tree after arriving at bearing age is engaged in two activities, viz., vegetative activity and reproductive activity. Now there is a proper relation between these two activities and happy is the orchardist who can maintain this proper balance. It is not an uncommon thing to find on old trees branches of same age, one of which has born many fruits while the other is guiltless of having produced any revenue to its owner. An examination of two such branches will show that one is in a balanced state while the unfruitful one is expending all its food in vegetative activity to the exclusion of fruitfulness. Since these two activities are antagonistic any practice which checks to some degree this excessive wood growth will tend to bring the tree into fruitfulness.

A fourth principle is the relation of pruning to fruiting. In a normal growing fruit tree there is a well-balanced condition between top and roots, and with a normal amount of moisture and mineral foods present there will be a certain amount of growth and a certain amount of food material stored each year. Heavy dormant

pruning will break this balance. The removal of a considerable portion of top without a corresponding disturbance of root system will result in an increased lateral growth of that part of the top remaining. Fruit spurs may even be forced into twig or branch growth. Conditions like this will necessarily reduce the fruiting capacity of tree for the time. Spasmodic pruning such as is indulged in by many men owning apple trees keeps them in a continued state of unbalance and such trees are consequently unprofitable. Moderate annual pruning of bearing trees must be the slogan of the successful fruit grower. Dormant pruning is always rejuvenating or invigorating, depending upon the severity of it. In old trees, or badly winter injured trees severe dormant pruning is often advisable, but unnecessary for well-kept trees. Pruning for fruit should consist in moderate annual dormant pruning, enough to keep trees vigorous, to keep the tops open so sunlight can reach the interior of trees, and a cutting back of too vigorous growing leaders thereby inducing a broad open head rather than a high dense one. It might be well to add that all ingrowing and chafing branches should be removed.

Careful orchardists have found that by pinching the tips of growing shoots just shortly before the terminal buds form tends to the development of more fruit buds. To the inexperienced, however, this is a delicate operation. If done too early in the season the pinched shoot will start two or three buds into growth and result in increased wood growth. If done too late no benefit is secured.

In pruning young trees it is well to keep in mind that much of the future value will depend upon forming the head. The age of high-headed trees has gone and we are now insisting that our trees shall be headed low. Three to five branches should form the framework for the top. These should be well distributed about the tree nor should they all spring from the same point. See to it that no bad forks are left in starting the head. Once well started subsequent treatment will be relatively simple and easy. Keep out all interfering branches, remove those that grow toward center, shorten back the more vigorous leaders, keeping the tree low and broad. An open center will result in development of fruit spurs along the scaffold branches and early fruiting is assured. Too much heading in develops many small branches causing a dense head. This is to be avoided.

In pruning all wounds should be clean cut. Branches should be cut off as near to parent branch as possible, the cut being parallel to the latter. Wounds made in this manner heal more readily. Stubs should never be left as they never heal over and shortly become a menace to the life of a part or to the whole tree. Large wounds should be painted using white lead and linseed oil. If preferred this may be darkened by addition of a small amount of burnt umber.

PICKING AND HANDLING FRUIT.

By Prof. F. C. Sears.

Few people realize the importance of proper care and proper methods in the handling of fruits of all kinds at the time of picking. With some sorts, like the more solid varieties of apples, a considerable amount of rough handling will be endured without serious results, but even these fruits are much better if treated more carefully, and with the perishable kinds, like peaches, the slightest bruising is likely to result in serious damage.

The first question to determine is the proper degree of maturity for picking and this will vary greatly with different classes of fruits, and even with different varieties of the same class. Three factors of a general nature might be mentioned as likely to influence the question of the proper maturity and these are, first, the kind or class of fruit; second, the variety; and third, the distance from market. Under the first head, the kind of fruit, pears may be cited as a general class which should be picked sometime before they are ripe. There may be a few exceptions to this, but as a general rule it will hold, while stone fruits on the other hand as a class are never so good as when they are allowed to ripen fully on the trees. One has only to taste the quality of our local fruit as compared with peaches, for example, shipped from California or even from Georgia, to see what a difference it makes to allow these fruits to become fully mature.

There is less difference between varieties of the same fruit, yet even here there is considerable variation in the proper degree of maturity. Firm fleshed varieties can be allowed to become much riper than softer fleshed sorts. The Elberta peach, for example, will stand up thoroughly well if picked when almost ripe while the Greensboro will go to pieces at once.

On the score of distance from the market the general rule may be laid down that the further one is from his market the greener the fruit must be picked in order to reach market in proper condition, and this is one of the strong arguments in favor of locally grown fruit and is one of the reasons why our New England growers will always have a very distinct advantage over the more distant fruit men in competing for our New England markets.

While it is impossible to give absolute directions as to the proper degree of ripeness for the different fruits the following suggestions may be helpful:

1. *Apples.* With summer apples or those varieties which tend to become "mealy" the fruit should be picked as soon as the skin begins to change color, showing full maturity. This maturity is also shown by the seeds turning dark and by the stem separating readily from the fruit spur. The late maturing varieties of apples are, of course, picked long before they are ripe, but are usually allowed to remain on the trees until after frosts, and even a fairly severe freezing while on the tree will not injure them if they are allowed to thaw out without being handled.

2. *Pears.* With summer pears it is desirable to pick usually as much as a week before they are fully ripe and this, as with apples, is especially important with the mild flavored sorts. As soon as the skin begins to change from a dead green to the more attractive shades of yellow the fruit may be gathered and stored in a cool dark place to ripen. The same indications as given under the apple apply here.

3. *Peaches.* These may be picked as soon as they show signs of becoming ripe on the shady side and the proper degree of ripeness ought to be determined by the color of the fruit and not by any handling of it. It is often recommended to judge of the degree of ripeness by the feeling of the fruit under the thumb, but this is entirely unnecessary. Any man who is fit to pick fruit ought to be

able to judge with very little coaching as to the proper ripeness from the appearance of the fruit and most varieties of peaches are so delicate that any "thumbing" will show almost at once.

4. *Plums.* While the proper degree here varies decidedly with the distance to market there is no fruit which is more decidedly improved by being allowed to become fully ripe on the tree. Even such low quality varieties as the Japanese will develop a surprising quality if they are allowed to develop fully before being picked. For distant markets it is of course necessary to pick before they are fully matured, but this, as suggested before, is one point in favor of the local grower.

5. *Grapes* should be allowed to mature fully on the vines. No other fruit improves so little after picking. If the fruit lacks its fine flavor when picked it will never make it up.

6. *Strawberries* should be picked as soon as they color and the longer the distance to market the less color is allowed. There should generally be some white on the berries if they are going even a short distance to market, but like grapes and stone fruits strawberries are better if they can be fully matured on the vines.

7. *Raspberries* are left until they separate readily from the receptacle which is usually a safe general rule.

8. *Blackberries* are usually picked as soon as they are fully colored, but for local markets can be allowed to stay on sometime after this and will develop better quality as a result. Here again we have a strong argument in favor of the local grower.

9. *Currants* are not picked until they color, but only need a slight color, especially if they are to be used for jelly, where the acid is needed to make the fruit "jell." Where they are to be used in a fresh condition they should be allowed to become fully ripe and it is surprising how long they will remain on the bushes and still keep in fine condition.

10. *Gooseberries.* These should be picked while quite green unless they are to be eaten out of the hand as is sometimes done with the large English varieties. For jam, etc. the seeds should be still soft, which means a considerable degree of immaturity. Where the fruit is fully ripe the seeds become hard and woody.

11. *Cherries.* These should be picked just before they are fully ripe unless for very local markets. The degree of maturity can

usually be judged quite accurately by the color. It is often recommended to tell by tasting, but when this is resorted to it frequently requires a good deal of time.

As an equipment for picking the fruit grower needs some sort of satisfactory receptacle in which to pick and usually some type of ladder. With a few kinds of fruits he also needs some type of shears for cutting the fruit. The proper receptacle will vary considerably with different fruits. As a rule some type of basket will be found best and the half-bushel swing bail oak picking basket is satisfactory for more different kinds of fruit than any other receptacle. Some growers use the ordinary peach basket for handling many kinds of fruit, but it it so frail as to be easily broken. Baskets which have been used in the orchard in this way frequently become muddy and are therefore not satisfactory for market. Bags are sometimes used for apples, but there is so much danger of the fruit being damaged that they ought to be ruled out altogether, even the combination pail with the cloth bottom is not very satisfactory. Galvanized iron pails are used in some sections and have a good deal to recommend them. In some sections it is customary to use a bushel box for apples and the practice has much to commend it as the fruit can be taken as picked directly to the storage house and not handled again until it is packed.

Two types of ladders seem to be especially satisfactory for low trees. Some type of step ladder and preferably one with three legs instead of four. This is much easier to establish firmly than the four legged type. For taller trees the ordinary orchard ladder is more satisfactory than the old type of ladder which has two side bars parallel. Another device which is worth considering is a low light bench which can be carried about easily. The basket is placed on this bench leaving the operators free to pick with both hands.

The operation of picking varies considerably with different fruits and skill can only be acquired by considerable practice. The following notes may be helpful.

1. *Apples.* These should always be picked with the stem on as a stem pulled out means a broken skin and probably decay. If the thumb is placed along side the joint between the stem and the fruit spur and then the fruit is given a quick twist it will usually separate

readily. Extreme care should be exercised not to break the fruit spurs from the trees.

2. *Pears.* These are practically the same as apples except that the fruit should be handled with even greater care and it is desirable to use smaller packages for picking.

3. *Peaches.* In this case the stem does not come with the fruit, but remains on the tree and care should be exercised not to bruise the fruit any more than is absolutely necessary in separating it from the stem. A straight pull will usually accomplish this. Pickers should also be cautioned not to hold one fruit in the hand while picking a second fruit as this is almost certain to bruise both fruits.

4. *Plums.* These should always be picked with the stem on and as far as possible should be handled by the stem. Considerable care will have to be exercised not to break off the spurs with the stems. A quick pull taking hold close to the stem will usually accomplish this result.

5. *Grapes.* Bunches are always cut from the vine with shears or knives, preferably the former. Take hold of the stem with the left hand or allow the cluster to lie in the hand while it is being cut. The less handling they can receive the better as every time the fruit is touched the bloom is removed.

6. *Strawberries.* Always pick the stem with the berry. "Hulled" berries are sure to decay or to lose moisture and wilt or shrivel. It is also desirable to sort into two sizes in picking.

7. *Raspberries.* These are picked without the receptacle and should not be picked until they separate readily from it. Several may be picked before they are put into the box.

8. *Blackberries.* These are always picked with the receptacle, separating at the joint between the receptacle and the stem. Several berries may be picked as with the raspberries.

9. *Currants.* These should be picked with the stems and the operator should take hold close to the spurs as the latter must be allowed to remain on the bushes.

10. *Gooseberries.* Pick with the stems on and use gloves. No special precaution necessary in picking except to do it with the least amount of discomfort to the operator.

11. *Cherries.* Cherries should be always picked with the stems on and the spurs left on the tree as they bear for several years.

While it is impossible to control the weather yet it has such an important influence on the fruit that it is worth a good deal of consideration by the orchard man. The main points to be desired are to have the fruit dry and cool and any change in the methods which will insure these two conditions ought to be made if possible. For example, if one is picking only a part of the time he should choose the cool of the day for this purpose and the fruit will arrive in market in better condition.

PACKING APPLES IN BOXES.

By R. W. Rees.

There is a great diversity of opinion as to the place of the standard apple box for New England-grown fruit. Some of our best producers argue that we should hold to the barrel for apples, as it is the established package for New England. Other progressive growers believe we should pack our finest grades in boxes and the medium quality in barrels. To me it seems to be a problem governed largely by the quality of fruit produced and the type of market to which we are catering. If one is growing high quality varieties, taking proper care to secure a large percentage of perfect fruits of high color, the standard box will prove to be a very profitable package. It must be borne in mind that our fruit is not generally known to the box trade and will not sell so readily as in barrels, but by a little extra effort it may be turned to very good advantage.

Packing Materials.

The standard apple box is 18 inches long, 11½ inches wide, 10½ inches deep, inside measurements. The ends of the box are ⅜–⅞ of an inch in thickness, the sides one piece material ⅜ of an inch thick, the top and bottom each made of two pieces ¼ inch thick.

Layer card is used under the first layer and on top of the last

layer of apples as well as being used between the layers in some of the packs as explained below. The card should be of Manila tag board 17½ by 11¼ inches.

Lining paper for lining the boxes should be 17½ by 26 inches, preferably white in color.

Papers for wrapping the fruit should be thin, soft, but tough in texture. The sizes will range from 8 by 8 to 12 by 12, according to the size of the fruit.

The table below will give in condensed form the common commercial packs as put up in the standard apple box.

Apples per box	Style	Number in row	Number of layers	Apples in layers 1– 2– 3– 4– 5–	Position of apples
200	3 × 2	8–8	5	40–40–40–40–40	On end
188	"	8–7	5	38–37–38–37–38	" "
175	"	7–7	5	35–35–35–35–35	" "
163	"	7–6	5	33–32–33–32–33	" "
150	"	6–6	5	30–30–30–30–30	" "
138	"	6–5	5	28–27–28–27–28	" "
125	"	5–5	5	25–25–25–25–25	" "
113	"	5–4	5	23–23–23–22–23	" "
112	2 × 2	7–7	4	28–28–28–28	On cheek
104	"	7–6	4	26–26–26–26	" "
96	"	6–6	2	24–24–24–24	" "
88	"	6–5	2	22–22–22–22	" "
80	"	5–5	2	20–20–20–20	" end
72	"	5–4	2	18–18–18–18	" "
64	"	4–4	2	16–16–16–16	" "
56	"	4–3	2	14–14–14–14	" "
48	"	3–3	2	12–12–12–12	" "
63	straight	7	3	21–21–21	" cheek
54	"	6	3	18–18–18	" "
45	"	5	3	15–15–15	" "

In starting the first layer of the 3–2 pack, place the first apple in the lower right-hand corner of the box, the second in the lower left-hand corner, and the third apple in the space between numbers one and two. The second layer is started by placing an apple over the

space between number one and number three of the first layer, and a second between number three and number two. The third layer is packed exactly as the first, the fourth as the second, and the fifth as the first and third. Where apples are unusually long in 3–2 size it is not necessary to use layer card, but if the apples are flat it is usually necessary to use card between the layers in order to bring the apples high enough for the required amount of bulge. In this pack the apples are usually placed on end. The 113 size apple in the 3–2 pack is the size that will pack a straight four tier, but it is usually advisable to avoid a straight or square pack.

The 2–2 pack starts with an apple in the lower right-hand corner of the box and the second placed in the center of the remaining space between apple number one and the lower left-hand corner of the box. The next two apples fit into the space left by the first two. The second layer is started by placing an apple over the space between numbers one and two of the first layer and the second apple over the space between number two and the corner of the box. For most apples it is customary to pack this style with layer cards between layers. The 2–2 style of pack starts with the 112 size, which is just too large to pack straight.

For commercial work it is best to pack apples on end wherever possible, as they will be less subject to bruising on the nailing press or in handling of the packed boxes. The notes given above as to position of apples are not ironclad rules and will vary somewhat with the shape of the apple.

When the pack is finished and ready for the nailing press, the fruit should be about one-eighth inch higher than the ends of the box. At the center of the box it should stand three-quarters to one and one-fourth inches above the sides of the box. The bulge should be firm and uniform, as it is the tension of the thin tops and bottoms on this bulge that holds the pack in place.

To develop speed in packing apples takes much practice, but if one uses care to see that the first three apples of each layer are properly placed and holds to a uniform size throughout the box, there will be little trouble.

PACKING APPLES IN BARRELS.

BY PROF. F. C. SEARS.

The barrel will probably long remain the most important apple package for New England. It has been used for years and while personally I think it is a barbarous package it will no doubt be used for many years to come. It therefore seems worth while to give more consideration than is usually done to the proper method of packing apples into a barrel. There are doubtless several different ways that are good. There certainly are many that are bad, but the methods here described have been gathered from experience and observation over a number of years in various orchard sections and have stood the test.

A word ought to be said first about the barrel itself and the equipment for packing.

The Sulzer law (which is the only authoritative pronouncement that we have on the subject of packing apples in barrels) gives the following as the proper dimensions for the barrel: "The standard barrel for apples shall be of the following dimensions when measured without distention of its parts; length of stave 28½ inches; diameter of head 17⅛ inches; distance between heads 26 inches; circumference of bulge 64 inches outside measurements; representing as nearly as possible 7056 cubic inches *provided* that steel barrels containing the interior dimensions provided for in this section should be construed as in compliance therewith."

If one is attempting to develop anything like a good trade it is better to buy new barrels. They cost a little more, but are certainly worth it. Second-hand barrels are useful to take into the orchard, but should not be sent to market. This rule is often violated, but it seems to me that New England has too long clung to this antiquated package. Even for orchard purposes second-hand barrels ought to be carefully cleaned up. This may be done with a broom and water.

In addition to the barrel the following equipment will be found useful. First, an apple packing table. It is very desirable to have a good sized table and one six feet long by three feet wide by six inches deep will prove an acceptable size. The inside should be padded, which may be done with old bags covered by burlap. It is often advisable to have the table set on two "carpenter's horses" rather than to have the legs attached to the table. If this is done the table top may be hung up on the wall when the packing is over for the season and thus not occupy much room. One-half bushel swing bail baskets are most satisfactory and these should be as smooth as possible. The "oak stave" basket is very satisfactory for this purpose. Some packers go so far as to pad the basket in addition.

For a barrel press one with a circle follower will be found most satisfactory. This circle follower can be made by any blacksmith, but a few firms are offering these presses with the circle follower instead of the ordinary bar follower. Another type of press which is very popular with some growers is the lever press. This is certainly expeditious and when one becomes familiar with it it can be used very satisfactorily.

A good stencil is another important part of the equipment. This should be made with fairly large and very plain letters and might contain something like the following:

Choice New England Apples
No. 1. Baldwins
Grown and Packed
by
John Jones
Boston, Mass.

It is also desirable to have corrugated heads (circular piece of paste board with one side corrugated), lace circles, and paper caps (these are circular pieces of paper or card board on which more or less advertising matter may be printed). The same legend given for the stencil will do, but it is usually customary to add still more in the way of advertising. This completes the equipment.

A word might be said next as to the proper grades for barrel

apples. The Sulzer Law, already referred to, gives the following on this subject: "Sec. 2. The standard grades for apples when packed in barrels which shall be shipped or delivered for shipment in interstate or foreign commerce, or which shall be sold or offered for sale within the District of Columbia or the Territories of the United States shall be as follows: Apples of one variety, which are well-grown specimens, hand picked, of good color for the variety, normal shape, practically free from insect and fungous injury, bruises, and other defects, except such as are necessarily caused in the operation of packing, or apples of one variety which are not more than ten per centum below the foregoing specifications shall be "Standard grade minimum size two and one-half inches," if the minimum size of the apples is two and one-half inches in transverse diameter; "Standard grade minimum size two and one-fourth inches," if the minimum size of the apples is two and one-fourth inches in transverse diameter; or "Standard grade minimum size two inches," if the minimum size of the apples is two inches in transverse diameter."

In my opinion this bill is open to serious criticism on account of the low standard it establishes. Anyone unfamiliar with sizes of apples will be surprised to find what a small apple a two and one-half transverse diameter gives and this is the largest size established by the bill. It seems to me that the old custom of No. 1, No. 2, and No. 3 is much better and if some idea of size seems desirable the Canadian method of calling for "apples of good size for the variety" is much more satisfactory since a two and one-half inch King, for example, would be a much less desirable apple than a two and one-half inch Golden Russet. I am very strongly of the opinion that the Canadian standards are greatly to be preferred to our own as established by the Sulzer Bill.

The actual operation of packing the barrel will be something as follows: First place a corrugated head in the bottom of the barrel with the rough side down. Next a paper cap if this is to be used and lastly a lace circle with the best side down. Second, select the apples for the face of the barrel. These ought to be a fair average of what the barrel is to contain, but should be of uniform size. Select about as many as will be required to lay the face. The stem of each apple is removed by a little pair of nippers called

stemmers and the apples are then poured into the barrel and placed stem end down, beginning with a circle around the outside of the barrel and continuing until the entire surface is filled in. In my opinion more care should be exercised as to the size of the face apples selected. Some sizes will work out very satisfactorily while others do not. If apples three and one-half inches in diameter are used there will be two circles, and one apple in the center which makes a handsome face. If apples three inches in diameter are used there will be two circles with three apples in the center, which also makes a good looking face; but if apples three and one-fourth inches in diameter are used the center has only two apples, which leaves a good deal of open space. Apples two and three-fourths inches in diameter give two circles with four apples in the center, which also makes a good face. I would suggest therefore that the three and one-fourth apple be left out and the other sizes used. A little experience in selecting the size will enable one to choose those which will fit in best. Having laid the first layer of the face we next select apples with a red cheek and place one of these in each opening in the face already laid, being careful to put the red cheek down in each case. This second layer serves two useful purposes. It stops the openings in the first layer so that the customer sees only a solid face and it fills in these openings with a handsome red color making the finished face much more attractive.

After the face is laid in this way the apples are selected with less care, choosing some larger and some smaller than the face apples, and three scant half-bushel baskets are poured in before any racking is done. The idea of this is to place sufficient weight on the face so that the apples will not turn when the barrel is racked. After the third basket the barrel is racked or shaken after each basket until it is nearly full, when the false or padded head (a circular piece of wood about the size of the barrel and padded on one surface) is placed on top of the apples and the barrel thoroughly racked, exerting some pressure on the false head during the process. This makes a smooth surface on which to place the last layer of apples and this "tailing of the barrel" is one of the most difficult steps. Personally I prefer to place these apples on the cheek as it is easier to get a smooth surface in this way, but either cheek or the stem end may be placed out, the whole object being to get a smooth

surface on which to exert the pressure. The proper height for this last layer is a matter on which authorities differ somewhat. Personally I believe that where the barrel has been thoroughly racked the apples should not be much, if any, higher than the edge of the barrel.

We are now ready to head up the barrel. With many orchard men it is customary to use what is called a "cushion head." This is a small quantity of excelsior enclosed in thin paper and it is placed upon the apples before the head is put in place with the idea of acting as a cushion and preventing some of the bruising of the apples that would otherwise occur. The press is now slipped into place, the head adjusted beneath the follower and with a screw or lever the head of the barrel is forced into place. This is an operation which it is difficult to describe and as a matter of fact methods vary a good deal, some operators loosening both hoops and others leaving the lower hoops tight and forcing the head into place. When the head is in place the hoops are driven home and six or eight six-penny nails are used to nail it in place. These should be spaced evenly around the barrel. As a final touch many orchard men put in "liners" which are small strips of wood and are nailed just inside the edge of the barrel and against the head, the idea being to give additional security.

The barrel is now turned over and what was the lower end marked with the stencil.

Barrels packed in this way will carry well to market, will give a good impression to the prospective buyer who looks at the face, and will "live up" to that favorable impression when the "prospective buyer" becomes the consumer.

CAN WE SELL OUR APPLES?

BY PROF. FRANK A. WAUGH.

There used to be a big fight in this country led by the agricultural people against the pernicious habit of dealing in futures. The grain growers of the middle west in particular felt that their interests were seriously prejudiced by the manipulations of men on the stock exchanges who speculated on next fall's wheat crops or next spring's hog market. The most inveterate and incurable dealers in futures are of course the farmers themselves. Every man who puts in a crop of any sort or breeds a litter of pigs or sets a dozen hens makes a bid against the future of the market. Nobody takes a larger chance in this way than the apple grower. He plants out an orchard with much labor and expense and is obliged to wait for a future several years distant before he can realize on his investment. What is that future going to be? Will it be one of bountiful harvests and high prices, or will it be a future of worms, fungus, hailstorms, middlemen and disaster? A large number of us are putting out apple trees, and the one thing which we would like to know better than anything else is what will be the situation in the apple markets 20 years from now. We have high hopes, but sometimes we have also our misgivings.

It is a matter of common knowledge that enormous plantings of fruit trees have been made in the past ten years. First there was the era of peach tree planting, when our nurserymen could not possibly supply the demand, even by sending out hundreds of thousands of June buds. Lately the furor in peach orcharding has fallen off somewhat, while the popularity of apple planting has increased. Every day we hear of new orchards planned or planted with thousands of trees, sometimes with hundreds of thousands. The nurserymen have doubled their prices on stock, but yet the demand has hardly been checked. In many cases it has been impossible to grow nursery trees to supply the planters. These millions of trees must some day be heard from, and they will undoubtedly make an impression on the market.

Another disturbing factor in the situation lies in the fact that the big plantings made in the last few years have been mostly in the hands of competent men. They have been organized by big stock companies who could hire expert overseers, or in many cases they have been in the hands of thoroughly experienced men who were planting trees on their own land, and we know that such conditions are likely to give genuinely good results. In the past apple trees have been planted largely by farmers on miscellaneous farms and have succumbed rapidly to neglect and mismanagement. It seems quite possible that the young trees which are now growing will have a different story to tell.

The orchard business has been furiously advertised in the last few years. The magazines have been full of it, and always the story has been told in its roseate colors. It would seem as though any government clerk or ribbon-counter jumper could buy a 10-acre "unit" of cheap farm land — $5 to $10 an acre — have somebody put it out to apples for him, and within four or five years be reaping an income of $1,000 an acre. The magazines seldom make it less than $1,000 an acre; the advertisements always make it more.

While these big stories have come to us in large quantities from the west, and while we modestly yield the premium to the Pacific Coast for tall tales, there has been some first-class lying done on this side of the Great Divide. It is perfectly possible to tell a glorious story about the apple growing business in New England, New York, or Virginia, and these parts have not been overlooked by the story tellers. It must be considered that many of the investments which have been made in apple land in the west and also in the east have been ignorantly and foolishly made; and that in spite of what we said, a good many of the orchards put out with this kind of investments are established on a basis such that they cannot win. We must expect to see some failures in apple growing, and while of course we are sorry to have anybody lose his money we will be bound to say in certain cases that it serves people right.

The census figures for 1910 show that there were over 65,000,000 young apple trees in the field not yet of bearing age. Now this number represents a potential increase of 44% in the bearing trees and may possibly give us some concern. If the output of apples were to be suddenly increased by 44% it would swamp the market.

There need be no doubt about that. Furthermore these young apple trees when they come into bearing will produce fine high-grade fruit. Probably there was never so many young trees coming into bearing before. There should be within the next few years a very large output of fancy apples, and it seems possible there will be some difficulty in disposing of them at the fancy prices which we have learned to expect.

On the other hand the census figures give us some encouragement also. They indicate that in 1910 the number of bearing apple trees in the United States was 50,000,000 less than it was 10 years ago. We know from reliable reports that hundreds of thousands of bearing apple trees are now being cut down. In the San José scale area the destruction of old apple trees goes on rapidly and amounts to thousands every year. In the mid-western states I am told on reliable authority there are thousands of acres of orchard land being cleared of apple trees in order to grow other crops. It would seem to be a fair balance of the figures if we assume that the 65,000,000 young trees now growing will do no more than make good the loss of old trees. Now this is of course a very different story and one which we can take some comfort in.

It is to be noticed further that the annual output of apples in this country had not been increasing during the last few years, but has remained remarkably uniform. This is shown by the figures of the American Agriculturist, which I choose to quote because they cover more years and are more consistent than the government figures. It should be said, however, that the government figures usually show larger quantities of fruit, though it may be doubted whether they more justly indicate the size of the commercial crop. The figures since 1899 are as follows:

1899	37,460,000	Barrels
1900	56,820,000	"
1901	26,970,000	"
1902	46,625,000	"
1903	42,626,000	"
1904	45,360,000	"
1905	24,310,000	"
1906	38,280,000	"
1907	29,540,000	"

1908	25,850,000	Barrels
1909	25,415,000	"
1910	24,225,000	"
1911	30,065,000	"
1912	38,310,000	"
Average 14 years	35,132,571⅞	barrels

All this happened while the population of the country has been increasing during the 10 year period from 1900 to 1910 from 76,000,000 to 92,000,000 While the number of apple trees decreased 50,000,000 and the annual output of apples also decreased or remained stationary, the population of the United States increased 21%. The apple consuming capacity of the country, it may be fairly assumed, increased considerably more. There are more people able to buy apples and pay good prices for them than there were 10 years ago. There are certainly a great many more people able to buy automobiles and similar luxuries now than there were 10 years ago. Yet apples are a luxury (if we so regard them) capable of reaching hundreds of times as many people. I consider it a very conservative guess to suppose that the apple consuming capacity of the public, measured in ability to buy good grades of fruit, has increased over 25% during the last decade. This, added to the numerical increase in population would make our possible apple market at least 50% larger than it was 10 years ago. Every year increases this potential market. With our market increasing so rapidly and with the production practically at a standstill, it would seem as though the future of the apple business were bright.

There are other features of the situation which are encouraging. We have to consider for example the fact that we have never made a serious study of the marketing of fruit in this country. We are a hundred years behind the ordinary business standards of America in this respect. While this may be a humiliating admission to make, it is a fact, and at least it encourages us to think that we can do better in the future.

One of the ordinary business practices in which we have as yet made no appreciable progress is the utilization of wastes. In all other great manufacturing industries large profits are made by this means. It is often said that the packing industry and other big enterprises make their entire profits from their waste products

It has been our practice to throw away the waste, and there is a truly enormous amount of it. We know that the apple market would be much better off each year if a considerable amount of poor fruit were taken out of the regular trade altogether and used up in some other way. At the same time great quantities of fruit which are now left to rot on the ground could be made into valuable food products. We already know that apples can be canned, dried or evaporated, but we have done nothing to develop the manufacture or marketing of such products. We know that apple cider is a good drink either for temperance people or for those who like it strong, but this market is practically untouched. We know that our apple parings can be shipped to France and made into champagne, shipped back to the United States, made to pay a heavy tariff, sold at fancy prices and money made for somebody. We know too that whatever money is made out of it is not for the American apple grower. We ought to be smart enough to turn these profits to our own account. We know that apple vinegar is much more wholesome than commercial mixtures of acid and city water, and we know that it commands a good market; but we have done nothing to develop the vinegar trade. Instead of that we have allowed laws to be passed in certain states (for instance Massachusetts) practically eliminating honest cider vinegar from the market. We know that the apple forms the best basis for all kinds of jelly and jam making, and we know that these products sell in large quantities and high prices, but we have done nothing to get in line for this business either. It seems perfectly clear to me that if we would take hold of this problem of manufacturing and selling poor grades of apples, we could make thousands of dollars out of the trade which now exists, we could greatly extend this trade, we could divert a considerable portion to our own control, and perhaps more important than all these, we could find new methods of manufacturing our products into profitable wares.

But the most conspicuous opportunity for future improvement lies in better selling organization. Up to the present time we have no organization amongst apple growers worthy of the name. If we compare our situation in this respect with conditions which exist in the tobacco trade, the steel industry, the oil industry, the distilling industry, and even in such legitimate lines as the breakfast food trade, the furniture business, the woolen and cotton

trades, we find that we have done nothing at all. It is a fact of course that the organizations which exist in many of these industries, for instance in the cotton trade and the dressed meat trade, have not been formed in the interests of the original producers. There is no reason, however, why they should not be; and there is every reason why the apple producers should organize their own apple trade before some group of promoters and bunco-steerers steps in and organizes it for them, as was done in the tobacco business. A fine model has already been set for us by the California producers of citrus fruits, especially the orange growers. They have an organization of their own which has done truly phenomenal service in the enlargement of their markets and in the promotion of their interests in many ways.

Even the smallest local coöperative selling associations managed with the most ordinary honesty and intelligence are capable of helping tremendously in the marketing of our apple crops. Why is it that such organizations grow so slowly?

One of the first benefits to be derived even from the lowest type of a coöperative organization, and still more to be realized through strong and centralized associations, is a better distribution of the crop. The distribution should be improved both with regard to season and with regard to territory. Every year there is a heavy rush of apples onto the market during September and October, giving speculators an opportunity to make profit at the expense of growers. The establishment of coöperative storage houses will enable growers to hold their crops until they are wanted and thus to avoid the excessive offerings of early fall.

A better territorial distribution of the crop would be still more valuable. At the present time the entire commercial output is shipped to a few big cities. Here it is stored and reshipped as ordered, but the crop is never fairly spread over the country where it is needed. There are thousands of small localities where apples are a rarity, where at least they are never offered in quantity. If we had a strong central organization which could discover these local markets and send the crops direct from the orchards to the consuming districts, we would find that the actual area of apple consumers in this country would be more than doubled.

As regards the handling of fruit this problem is already on the

way to a solution. The solution appears to be coming through the development of a mail-order trade. A considerable number of men in all parts of the country who have fancy box apples are advertising them in the papers and in other ways and are finding customers in all parts of the country to whom boxes are shipped by express. Perhaps we may hope for some improvement in express rates and conditions at the present time, all of which will have a tendency to increase the mail-order apple trade. At the present time it seems not only possible, but probable that this will form an important feature in the wide distribution of the best grades of fruit.

This leads naturally to speak of advertising. Now anyone who has watched the development of American business knows how much of it is due to advertising. Most of the great successes in this country, from patent medicines to breakfast foods, have been built upon intelligent advertising. Certainly the consumption of any one of these eatable or drinkable products has been increased not by 10% or by 20%, but 100 times or 500 times by a strong advertising campaign. The advertising method is strictly applicable to the apple trade, provided the business can be centralized to some extent. No one grower can afford to do it on his own account, but a large combination of growers can well afford to undertake it, and the larger this combination the cheaper and more effective will that advertising campaign be.

This method has already been thoroughly tested by the California orange growers. Their central association, which handles some 60% of the output of California, last year selected four states in the central Mississippi valley for an experiment in advertising. They put small attractive advertisements in all the local papers in this territory and the first year increased the consumption of oranges in those states by 200 or 300%. The fact is that the orange growers are our natural competitors, and that if we don't wake up and attend to our business they will cut a large part of our trade out from under us. Most people would just as soon eat apples as oranges, but they do not know where to get good ones, and the merits of the apple are not kept constantly before them.

It may be remarked in passing that the magazines and the local newspapers offer the best advertising mediums for the apple busi-

ness. It certainly would be a great mistake to undertake to advertise apples on the bill boards along with talcum powder, patent medicines and various brands of cheap whiskey.

Another form of advertising which we have sadly overlooked, which would be very easy to take up, and which ought not to wait for any further organization, is a general apple eating propaganda. Such a propaganda ought to keep before the people everywhere the value of the apple as a food, with plenty of stress on all the other virtues of apple eating. Every one of our horticultural meetings and fruit shows ought to have large cooking demonstrations going on constantly so that everyone who comes in will have a chance to see and test apples prepared in all kinds of ways. Little things of this kind go far toward popularizing any article of food.

These methods of enlarging our apple market which I have just been discussing apply chiefly to the selling of first-grade fruit. It has long been our ambition to grow nothing but first-grade apples and to sell them at high prices. Everyone wants to put his crop in boxes and to get $3 or $4 a box. This is a very laudable ambition and one capable of being realized on a much larger scale than anything we have yet attempted. Let us not relax in the least our efforts to produce high-grade fruit, to put it up in the fanciest manner possible, and to get the fanciest possible prices for it. At the same time it is foolish to forget that there are hundreds of thousands of people in this country who cannot afford to pay $3 or $4 a box for apples. In fact the market for apples at $2 a barrel is very much larger than it ever will be for the $3 a box kind. Moreover it is possible for us to cater extensively to this lower priced market. We can grow hundreds of thousands of barrels of apples in this country to be sold at $2 a barrel and still make a profit for the growers. It is perfectly right and natural that we should have put the emphasis in recent years upon the production of high-grade apples, but this is no reason why we should overlook the important fact that it costs a great deal more to produce fancy apples than to produce medium grades. It would be very much better as things now exist for a considerable number of men to stop fooling with the box trade and settle down to a straight barrel basis. The greatest enlargement of the apple output for the future can be made on the basis of good sound medium priced apples for the ordinary consumer.

It is a fact of course that this ordinary consumer, represented to us perhaps best by the city wage earner, should buy his fruit in smaller packages — bushel boxes or even less. I am inclined to believe that this situation even though it presents some difficulties can be met with entire success. That is I believe that after we have learned how to pack high-grade apples in boxes we can also learn how to pack fairly cheap apples in cheaper boxes and put them in the hands of wage earning consumers at prices which they can afford to pay.

Even this does not by any means exhaust the possibilities of extending the American apple trade. We have the foreign market still to consider. Something has already been done of course in the shipment of American apples to Europe, especially to the British Islands. Our present shipments run from 1,000,000 barrels to 1,500,00 barrels a year. It is plain to all of us that that market is limited. While England will take a considerable quantity of fruit, the country is not big enough to take everything which we might like to ship in years of plenty. At the same time it is true that we have never taken even ordinary business pains for the development of this British market. The Canadian government keeps a staff of well-trained men in England and Scotland to look after the apple trade. They advertise Canadian apples widely, they make exhibits at all fruit shows and before boards of trade everywhere, they meet the dealers and arrange for sales of Candian apples, they meet all shipments of Canadian apples when they arrive, inspect the fruit, and if the shipments are not all right, defects are immediately reported to the original shippers so that similar troubles may be avoided in the future. If our American apple growers should be represented in Great Britain by a staff of clever and intelligent men who would perform similar services for us, we could easily double our sales of fruit and perhaps triple and quadruple them, at the same time realizing better profits on what we ship.

The apple trade in continental Europe is at the present time almost nil so far as we are concerned. A very few apples, mostly from California, are put into France and Germany every year, yet there is no market in the civilized world where such a shortage of apples exists as in the markets of France and Germany. The difficulties of getting our fruits into these countries are considerable,

but by no means insurmountable. If we would apply to this problem also the same business energy which is given to the selling of other American products, we should find a large and lucrative outlet for our fruit on the continent. American shoes, American steel, and American Standard oil are now sold in that territory in enormous quantities.

Speaking of the foreign markets we have always to consider another opening which has been neglected with a consistency and thoroughness most remarkable. This is the market which exists in the tropics and sub-tropical regions, in a territory naturally tributary to our shores. Good apples are a rarity even in the Gulf states where the markets could be reached by relatively short and easy shipments. It certainly is a fact that New Orleans, Jacksonville, Galveston and all the Gulf territory do not use one-tenth the quantity of apples which they ought to use. When we go beyond this and reach Mexico, Panama, Cuba, Jamaica, and all the country round about the Carribbean Sea, and even further south, we have a region in which apples are almost unknown. I have recently heard from friends living in different parts of these tropical lands and know that they are longing for good old-fashioned apples. This is a demand which it would pay us to meet more than half way with our products. There is no more difficulty about shipping apples to Porto Rico, Jamaica, and the Barbados than there is in shipping bananas from those countries to our markets. Why in the name of business common sense do we not do something for that trade? The quantity of fruit which could be disposed of in that section under proper conditions would be enormous.

Perhaps it would be well now for me to summarize the points which I have tried to make and which present my principal reasons for having great confidence in the future of the American apple growing industry.

1. First of all it seems that though American apple plantings are extensive our actual output of apples is not keeping pace with our increase in population.

2. It seems clear that the apple consuming capacity is increasing faster than the numerical census. The same number of people can eat and ought to eat a great many more apples than they do today.

3. Our markets could be greatly enlarged in many ways and among others by the better utilization of waste fruit. There seem to be several opportunities for making a good deal of money in this way, and a much more extended study of the manufacturing and selling of by-products ought to be a part of our regular apple growers' campaign.

4. A great deal could be done by organization. This is one of the prime needs of the present time. Organization would help first of all in a better distribution of the crop. It would spread the crop over the season better and would distribute it over the country at large in a more advantageous manner.

5. The mail-order trade seems likely to offer a feasible method for the distribution of a fancy grade of fruit in boxes.

6. A general advertising campaign which could best be conducted by a central organization yet to be formed would seem likely to increase the consumption of apples very materially.

7. A general apple eating propaganda can be carried on by various means. Our apple growers' conventions and exhibitions should give attention to this feature of their work.

8. We ought to give special study to the problem of producing large quantities of fairly good apples at a low price for the benefit of that great section of our population which ought to eat apples in quantity but which cannot afford the fancy box prices to which our ambitions have chiefly turned in recent years.

9. There are still great opportunities undeveloped in the foreign markets. This is true in the British market where we have already made a beginning. It is true of continental Europe which is almost untouched, and it seems to be especially promising in the semi-tropical regions immediately to the south of us.

PEAR CULTURE.

By Wilfrid Wheeler.

The cultivated pear is not native to North America, but is derived from two sources, the European pear, which was brought here at the time of the first settlement of the country, and the Chinese pear, which was imported in the early part of the 19th Century.

Compared with the apple the pear has several disadvantages which work against its popularity. In the first place it is ready for eating at a time when it comes into competition with the juiciest and most delicious of all fruits for eating out of hand — the peach. The plum also competes for popularity at the same time as the earlier pears. Pears that go into cold storage meet the competition of the apple and tropical fruits, and the number of ways of preserving and cooking pears is much more limited than with the apple. For this reason the consumption of pears will perhaps never reach such quantities as the apple, orange, or banana. Perhaps for this very reason this is one fruit where the planting of new trees in the last few years has rather lagged. Pear growing has not been boomed as have apple and peach orcharding and it would seem as though today there were better opportunities for planting pears than ever before.

Eastern Massachusetts, and especially the region immediately around Boston, has always been famous as a pear region. This section is admirably adapted to growing the highest quality pears, and the work of two famous orchardists, Wilder and Hovey, did a great deal to add to the fame of Boston and its vicinity as a pear growing section. These two men, at their orchards in Dorchester and Cambridge, made a very valuable series of experiments with pear varieties; in fact at one time Col. Wilder had over 400 varieties in his orchard. Their work has been perpetuated by the pears which bear their names.

Practically all of our best parent varieties have been imported from Europe, but the best seedlings of the Oriental pears have originated here, such as Kieffer and Garler. These latter are crosses with European varieties. Some attempts at hybridizing the pear have been made, and we have some good varieties of our own among which are Clapp's Favorite, Seckel, Dana's Hovey, Sheldon, and Lawrence.

More pear trees should be planted here now — the opportunities were never better. The soil and climatic conditions in all the Eastern Counties of the State, with the exception of Dukes and Nantucket are just right for pear growing, as the history of pear growing here has conclusively proved; while our market facilities are too obviously remarkable and have been too often narrated to need dwelling on now. One especial advantage that Boston has over other cities of the county as a pear market is that the public here has been educated up to certain varieties because they have been grown for so many years and to such high perfection in the immediate vicinity. Such varieties are Seckel, Bosc, Anjou, and Dana's Hovey.

In selecting the varieties for a pear orchard particular attention should be paid to local conditions. It is a great mistake to try to force a variety of pear to grow out of its natural environment and the most perfect fruit cannot result if this is done. Such varieties as Winter Nelis, Bartlett, Comice, and Easter Beurre, do best on the Pacific Coast; and Oregon is now growing unexcelled Bosc pears. New York State grows splendid Anjou and Bartlett. The best varieties for Eastern Massachusetts are Seckel, Bosc, Clapp's Favorite, Bartlett, Sheldon, and Dana's Hovey; though many other varieties do well here.

Planning the Orchard.

In deciding on the location of a pear orchard, the soil is a most important consideration. It should be rather heavy in character — with some clay in its composition — deep and well drained, but at the same time retentive of moisture. A light sandy soil like that on Cape Cod or Southern New Jersey is not at all adapted to pear growing. In New York State deep clay soils are used almost

entirely and on these soils the trees live to a great age, in fact some trees in New York State are still bearing which were planted over a hundred years ago.

In Massachusetts a deep loam over a black sandy subsoil is good. A gravelly soil will do for the Oriental pears which are not so long lived, but is not so satisfactory for the European kinds.

Unlike apples, pear trees do not need high elevations to produce the highest quality fruit, in fact orchards near sea level do very well indeed.

The trees should never be planted in sod, but always in cultivated ground, and the soil should be prepared as thoroughly as for corn or potatoes before setting the trees. The young pear orchard is well adapted to interplanting with other crops, one reason for this being the fact that the habit of growth of the tree is upright rather than spreading, and so does not shade the ground. Currants, gooseberries, and strawberries are all ideal crops to plant in the pear orchard, and asparagus may even be set if the rows are not nearer than four feet to the trees.

Dwarf pear trees are commercially successful while dwarf apples are not; but the chief objection to dwarf pears is that with this fruit the difference in size between the dwarfs and the standards is not nearly as large as with the apple; and as the standard pear is a small enough tree to be easily cared for, the chief argument for the dwarf falls to the ground.

The best distance for most varieties is 16 × 16 feet, although Seckel may be set as close as 12 × 16. The former distance is more desirable when intercropping is to be practised as it allows four rows of a variety of crops to be planted between the rows of trees.

A medium grade of two-year budded trees is the best to plant. Whips should be secured if possible and cut to 30 inches. The height at which to head will depend of course on the shape of tree desired, the variety, and the methods and tools to be used in cultivation. There is very little danger of heading pear trees too low however, both because of the upright habit of the tree, and because modern orchard tools will permit of close working almost all trees no matter how low they are headed. Bosc trees on account of the poorly shaped and straggly growth of this variety should be top-worked on some better stock, like Anjou or Bartlett.

In setting the trees the holes should be dug deeper than for apple trees, and care should be taken that good top soil comes in contact with the roots. The use of the planting board will insure straight rows. No fertilizer or manure should be put in the hole at the time of planting.

As with other fruit trees, the use of manure alone as a fertilizer tends to produce too large a wood growth. A better balance can be preserved if a mixture of chemicals with a large proportion of the minerals is used. A mixture containing 300 pounds muriate of potash, 200 pounds nitrate of soda, and 1000 pounds basic slag is recommended, and in applying it about one pound per tree per year should be used after the first year.

As has been said, the pruning when the trees are set out should consist of cutting back to whips about 30 inches high. From that time until the trees come into bearing all pruning should be with the idea of shaping the tree. Excessive pruning tends to force a sucker growth and also without question delays the trees from coming into bearing. After the trees begin to bear however, much heavier pruning will be necessary. In all pruning, the cuts should be made just above spurs and near heavy wood. The pyramid is the best shape for standard pears. This shape is secured by maintaining a central shaft to the tree and leading from it successive tiers of side branches.

The success of any method of pruning will depend somewhat on the variety. Bosc, when on its own root will never make a very shapely tree. As with other fruits, the life of the pear tree will be prolonged if all cuts are painted over.

As has been said earlier in this article a number of very high quality varieties can be grown in eastern Massachusetts with especial success. For a commercial orchard it is a good idea to select a list which will extend over the season, both because of better distribution of labor and so as to keep customers supplied throughout the season. A list of high quality pears which would meet this requirement would be Bartlett, Seckel, Bosc, Dana's Hovey, Anjou, and Lawrence. Clapp's Favorite, Sheldon, and Lincoln are also suitable to this locality, but it is best to keep the list of varieties a small one except for home orchards, and the habit of rotting at the core is a serious fault with the Clapp's Favorite.

While the trees are growing, before bearing age, the chief pests that must be guarded against are gypsy and brown-tail moths, scale, borers, pear midge, pear psylla, pear slug, fungus and pear blight.

No fruit tree is more subject to scale than the pear, and the spraying for it should be just as thorough and unremitting as for the apple. Either the concentrated lime and sulphur at a strength of one to eight, or soluble oils at a strength of 1 to 15 will satisfactorily control this insect, if thoroughly applied. This same spraying will do much toward controlling the pear psylla, especially if all other trees and shrubs in the vicinity are thoroughly covered. The pear slug and pear midge work on the leaves during the summer and must be killed with a contact insecticide. The best spray to use for this purpose is lime and sulphur diluted to the summer strength, as it is also an effective fungicide and will do much toward controlling the pear fungus and scab. This latter may also be controlled by Bordeaux mixture applied as soon as the leaves are well developed. Borers, as in peach trees, must be dug out with knife and wire. The most serious of all pear tree troubles, the pear blight, cannot however be controlled by spraying. Fortunately it is not as prevalent in eastern Massachusetts as in some other producing sections, but still does occasionally appear. It indicates its presence by the drying up of the leaves and the blasted appearance of the twigs. The only remedy is to cut off the affected part well below the point to which the blight has run, being careful to burn all affected parts.

When the trees begin to bear, the fruit itself may be attacked by codling moth, scale, and scab. The same spraying should be done against the codling moth as with the apple, that is, applying 2 lbs. arsenate of lead to 50 gallons of water immediately after the blossoms fall. Scabby fruit may be cured by the same spraying as for fungus, that is with the summer strength of lime and sulphur. It will also be advantageous to scrape the bark of trees where scab is troublesome. The variety which is most affected with scab is the Flemish Beauty, but with careful spraying even this pear can be grown clean.

The above may sound like rather an elaborate spraying program, but it will be seen that the sprayings can be so combined that only two or three annual applications will be essential, as with the apple. These should be:

1. Dormant spraying with lime and sulphur, 1–8, to control scale and kill fungus and scab spores.

2. Spray just after leaves are out with Bordeaux mixture for scab and fungus.

3. Spray just after blossoms fall with concentrated lime and sulphur (1 to 40) and 2 lbs. arsenate of lead to every 50 gallons of mixture. This application combines the properties of a fungicide, contact insecticide, and stomach poison, and is therefore the most important of the year. The second spraying may be omitted in most orchards.

Cultivation of the pear orchard should be carried on just as thoroughly as with the apple orchard, that is, the land should be plowed early in the spring, harrowed frequently during the summer to conserve moisture until about August 1st, and then it may be sown to a cover crop. In this climate a combination of rye and vetch, 1 bushel of the former and 20 pounds of the latter will make a satisfactory combination for broadcasting in the orchard, as both plants are hardy, and the vetch is a legume.

Thinning the fruit is a very profitable practice, especially if a fancy product is arrived at; and it is the fancy pears which bring the best money. It should be done when the pears are about the size of walnuts. All imperfect and defective specimens should first be taken off and in addition the fruit should be thinned so that no two individual fruits touch each other. This will take courage and it is doubtful if it is done in many orchards, but one trial will convince anybody of the value and profit of the practice.

The pear is one of the fruits which is better ripened off the tree and so should be picked while still hard. A good rule to follow is to pick as soon as the fruit will separate readily from the spur. This generally means about two weeks ahead of the natural ripening season, but no definite rule as to date can be set down. Winter pears should be picked just as soon as they reach a good average size for the variety, for the storage limit is longer when the fruit is picked hard. When intended for storage the fruit should be placed in cold storage as soon after picking as possible, and kept at a temperature of not less than 38 degrees. When taken out of storage, the fruit should be ripened slowly in a moderate temperature.

STORAGE LIMITS OF VARIETIES.

Bartlett	6–8 weeks
Seckel	8–12 "
Sheldon	10–12 "
Bosc	10–15 "
Anjou	15–20 "
Dana's Hovey	15–20 "
Winter Nelis	15–20 "
Kieffer	15–20 "

In ordinary cellar storage, very few varieties will keep more than 10 weeks.

In the Boston market, most native pears are sold in the regular bushel box. Western fruit is packed in what is known as the Western State Box. A great many New York State pears going to New York City are packed in barrels but this method is not usual in New England markets. On account of their irregular shape pears are much harder to pack than apples in any kind of container. They should of course be carefully graded, and wrapping each specimen of the first grade in tissue paper makes a more attractive package.

COÖPERATION AMONG FRUIT GROWERS.

By Dr. Alexander E. Cance.

The matter of coöperation among fruit growers has received comparatively little attention in New England, although it is one of the factors in New England fruit growing which needs emphasis. The lack of coöperation among our fruit growers is probably due to the same reasons that affect coöperation in other lines of agriculture in the East. The great success of coöperative fruit packing, shipping, and selling among the fruit growers of the Pacific Coast gives us some idea of the possibilities of this form of coöperation when carried out by progressive growers.

Advantages of New England.

New England fruit growers declare that so far as natural conditions are concerned, this part of the United States is well fitted to compete with any other part of the country in the raising of apples and a good many other fruits. In the first place, a great many varieties of fruits may be raised, varying from the early fruits to those that mature late in the season. In the second place, our soils are as well adapted to fruit growing as the soils of any other part of the country. In the third place, our lands are cheaper than the land on which most fruit is grown successfully. It is quite possible to purchase several acres of New England land for the price of one acre in the fruit growing region of the great northwest.

The quality of the fruit, of whatever variety, is unsurpassed. Fruit lovers state that the flavor and texture of New England apples is far superior to that of the larger and more highly colored apple of the Pacific Coast.

Finally, the advantages of the market are ours. There is no part of the country in which the grower is so near a good market as the grower in New England. Fruit growers in the West ship their

fruit across the continent at a cost for freight practically equal to the price which the Massachusetts grower receives for his apples. In New England our markets lie immediately at our doors. They are markets that take not only the highest quality of apples, but the medium grade apple; not only apples in barrels, but apples in boxes and smaller packages. In short, so far as the soil, climate, cheap land, quality of fruit and market facilities are concerned, New England stands foremost as a fruit raising section.

Disadvantages of New England.

Despite all this, New England fruit growers find that they cannot compete with the western growers thousands of miles away. They find that western apples bring a higher price than home grown apples. They frequently find that at times when home grown apples cannot be sold at all, the western apples have a good place on the New England market. What is the reason for the difficulty which the New England grower has in marketing his products?

In the first place, the fruit growing industry is not specialized in New England. Fruit raising, except on a few farms, is an incidental industry. The farmer has a few trees, or has set aside a few rods for fruit, but his main dependence is probably dairy farming, potato growing, onion raising, or poultry products. This is a disadvantage chiefly because the fruit, being an incidental matter, is handled incidentally and does not bring the profit it should, since the farmer takes no particular interest in it.

In the next place, there are very few expert fruit growers in New England. Thanks to the encouragement of such societies as the Massachusetts Horticultural Society and the Agricultural Colleges, a much greater interest is being manifested in fruit raising, both in growing the crop and in preparing it for market. But, until a larger number of expert fruit men come to the front, it is evident that New England fruit will not be able to compete on the market with better growers and more specialized regions.

The greatest disadvantages, however, are in the marketing. The New England fruit grower is an individualist. He packs the fruit and markets it in his own way. A half-dozen fruit growers have a half-dozen different packages, and a half-dozen different

grades of fruit. Neither the package nor the product is standardized. Number 1 apples in Springfield are altogether different from Number 1 apples in Boston. The Boston package is different from the Springfield package. Because he has a small quantity, each individual puts his fruit on the market without reference to any one else. He cannot expect to get a large price for it because he has very little to offer. The marketmen cannot depend either on the grade of the fruit or on the time of shipment, nor can they expect a sufficient quantity of fruit to meet the demands of their customers.

More than this, the storing, grading, and supplying the trade is practically all in the hands of dealers, jobbers, and commission men. The fruit growers, who should keep in their own hands the standards of packing and grading, have turned them over to disinterested parties. Consequently the fruit growers of New England, with all the natural advantages which this section of country affords, are at a great disadvantage in placing their product before the consumers.

Advantages of Organized Marketing.

At the present time, the fruit market wants a standard quality of goods, dependable and guaranteed. It is essential to a wide market that fruit be purchased by grade or sample. So long as the customer must examine every barrel of apples which he buys in order to find out their quality, so long will the apple growers receive comparatively small prices for their apples.

In the next place, the market wants a uniform variety of apples, uniformly packed and graded. The definition of the grade is not so important as the uniformity of the grade. It will be a happy day for fruit growers when Massachusetts passes a law, conforming to that of other states, defining standard grades and standard fruit packages. More than this, the market must have a sufficient quantity of fruit to meet its demands and the fruit must be shipped to the market regularly.

Now the individual grower is not in a position to give the market what it wants unless he has a very large quantity of fruit. Our small growers are not able to supply a sufficient quantity of fruit; neither are they able to ship regularly nor to establish standard

grades. If, however, the fruit growers in a given region unite to ship their products, fix a standard grade, build a storage house, and ship their fruit regularly to known markets, they are in a position to fill the needs of the market.

Western Experience.

Western fruit growers, especially in Washington and Oregon, some years ago found it necessary to form organizations for shipping their fruit. So successfully have they done this that the organizations now have practically full control of each grower's crop from spraying time until the crop is marketed. They have, by very stringent rules, forced their members to comply with rigid methods of grading, packing, selling, and spraying, so that now a box of apples bearing a certain label is just exactly like every one of a hundred thousand other boxes bearing the same label and the same brand.

These organizations have made a name for Oregon and Washington apples all over the United States and in a great many markets in Europe. Their goods have been advertised because of their dependable quality and uniformity. They are absolutely true to type and true to grade. A customer buying a box of these apples knows just exactly what he is going to receive, and the marketman knows that he can get an unlimited supply. This standardization of product and guarantee of quality have been the two most important factors in the tremendous success of the western fruit growing sections.

Possibilities in New England.

What are the possibilities of coöperative fruit marketing in New England? It is not possible to form an organization for selling apples unless there are sufficient apples of a given variety and grade in a comparatively small community, to make carload shipments possible. But there are some sections of New England where a sufficient number of good apples of one variety is raised to make coöperative packing and shipping possible. In these places, and

where small fruits such as strawberries, raspberries, blackberries, cherries, etc. are raised, it is quite possible for growers to coöperate in the shipment of their fruit.

The essentials of an organization for shipping are few and simple. In the first place, as we have said, there should be sufficient good fruit of a given variety; in the second place, the members joining the organization should contract to sell all their fruit through the organization for a period of say three years. A method of packing and grading should be agreed upon, the members to hire an expert packer and inspector to do the grading for them. This is almost essential because growers can seldom be trusted to pack their fruit uniformly. The members should raise a small capital by means of shares, choose the best possible business man among them to manage the selling of the fruit, and incorporate under the laws of Massachusetts, which provide for a coöperative organization on strictly coöperative lines.

The most essential factor in such an organization is a good manager, one who has business ability and is given a free hand in marketing the fruit for the organization. It is also essential that the members be thoroughly loyal and turn in all their fruit for the time agreed upon to the organization. This method has worked out exceedingly well among strawberry and raspberry growers along the Atlantic Coast, and the success of the cranberry growers in New England is very well known.

The Benefits of Coöperation.

The benefits of an organization of this kind will be very quickly felt not only on the market for the fruit of New England, but on the growing of the fruit itself. The whole history of coöperation in Europe has demonstrated that coöperation for marketing very quickly reacts upon the quality of the produce grown. Coöperative selling means better selling, better pruning, better care of orchards, and consequently a much larger percentage of marketable fruit.

The first great benefit, however, that would accrue to an organization would be the widening of the market for fruit of a given community. In a year or two it would result in very much better

prices for the fruit. A little later still, coöperative marketing would result in a wider distribution because the fruit so labeled and branded would be known and demanded by consumers. Incidental benefits would accrue in cheaper shipments, because of shipping carload lots, and better prices because sold in quantity and guaranteed as to quality.

Perhaps the most far reaching result of such an organization would be the establishing of grades and standards. Every barrel of fruit shipped by an organization should be stamped with the name of the organization and the number of the grower of the fruit. This would make the organization responsible for the fruit, and every individual responsible to the organization for the fruit which he furnishes. The discipline would be good and the effect on the market would be tremendous. There is no reason why, after a few years, when a few of these organizations have been established in the chief fruit growing sections of New England, they should not be federated into a general marketing association which would put upon the markets of New England and the world a splendid fruit grown in New England and guaranteed by the New England growers.

The possibilities of such an organization are remarkable. Not only might they sell their fruit, but also buy their fertilizer, spraying material, and other supplies. Very soon they would control the whole policy of fruit growing in a way that no loose organization, such as the Massachusetts Horticultural Society, can do. It is to be hoped that the wide-awake fruit growers of Massachusetts will look alive to the possibilities of this, the weakest point in the fruit business of New England.

PEACH GROWING.

By Prof. Frank A. Waugh.

The following is a condensed report of the lecture:

New England and Massachusetts in particular have generally been regarded as lying outside the commercial peach belt. In the past few years, however, the industry has developed largely in New England, especially in Connecticut and in certain districts in Massachusetts, and it seems to be a fact that the New England orchards have paid better returns than those in the famous peach districts of the South. This is largely due to the extra good market of New England and to the fact that the peach can be best handled in the neighborhood where it is grown. This fruit does not stand distant shipment well.

Climatic factors. The peach is supposed to be only partially hardy. It does not thrive north of Massachusetts and is not a safe crop in the higher altitudes of this State. Whenever the temperature goes below -20° during the winter the buds nearly always freeze. Only under the most favorable conditions will they withstand a lower temperature. In many cases they will be frozen and killed with temperatures between -10° and -20°. This winter freezing of the buds is the chief climatic danger which the Massachusetts peach grower has to face.

A great deal has been said about the killing of buds and blossoms by late spring frosts. This damage does sometimes occur in other districts, but is very rare, indeed almost unknown, in New England. For this reason the methods of smudging and orchard heating successfully practiced in some western orchards have no application here.

Soils. The peach is generally said to be adapted to light soils. Perhaps it will thrive on soils somewhat lighter than the apple, but the difference is not marked. A light soil if well drained and supplied with reasonable plant food and fair water holding capacity

will carry a successful peach orchard. As a rule it may be said that as far as the soil is concerned peaches will be entirely suited on land well adapted to potatoes or corn. This is as fair a statement as can be made in general terms. The soil must be deep and the subsoil porous.

Altitude. The location and exposure of land is quite as important as the composition of the soil. It is not necessary to have a high altitude, but it is rather important to have rolling land so placed that there is lower land immediately about it. This provides for atmospheric drainage, which is more important than absolute altitude.

The importance of exposure with reference to the point of the compass has been greatly exaggerated in the past. In some cases exposure is a factor, but in other cases it may be wholly disregarded. In general, northern and eastern exposures are preferred where there is a difference.

Securing trees. The propagation of peach trees may usually be disregarded by the fruit grower inasmuch as he will find it most advantageous to buy his stock direct from the nursery. These trees should always be one-year old, good, clean, strong and well branched. It is customary to grade these trees according to height, which is as satisfactory a classification as any. Trees four to five feet high may be considered a safe investment and will usually form the bulk of the planting. Small weak trees or those more than one-year old should not be used under any circumstances. For this reason "June buds" should be avoided.

Planting. Fall planting is probably advisable under any conditions where it can be well done. If spring planting is adopted it should be done as early as possible, that is, as soon as the ground dries sufficiently to be worked.

The customary distances for planting peach trees are eighteen by eighteen and twenty by twenty feet. In Massachusetts it is safe to adopt the minimum spacing. Indeed in the hands of good growers it is perfectly safe to plant peach trees at one rod apart each way.

In this part of the country peach trees have frequently been planted as fillers between rows of permanent apple trees. This practice is neither very good nor very bad. If properly managed

it may be entirely satisfactory. If badly managed it will result in great damage to the apple orchard.

Pruning. At the time that trees are set out they should be severely headed back. This means that the side branches should be cut off and the main stem shortened to 12–18 inches. Low heading is almost obligatory with peach trees and has many advantages. Instead of having any main trunk, like that of an old-fashioned apple tree, it will be better for the commercial peach tree to have four main stems arranged in the form of a vase. The vase form of pruning is generally preferred by all growers and any deviation from this is of minor importance. After the tree has been formed and has begun to bear it will require frequent heading-in. This may best be done by summer pruning during the first half of June. In cases where the fruit buds are killed by winter freezing it is possible to give a vigorous pruning in early spring, preferably before April 1st. At such time the trees may be cut back considerably without sacrificing a fruit crop. The practice sometimes adopted of "dehorning" or cutting the main branches clear back to the principal stem is not recommended.

It should be understood that a peach orchard is not a permanent plantation. Under favorable circumstances the trees will live to an age of fifteen or twenty years, but this is about the limit of profitable existence for a commercial orchard. After a certain time, now usually estimated at fourteen years, the peach orchard must be abandoned and it will be better management to clean it out entirely at that time. The land is then put into general crops for two or three years after which it may be returned to peaches.

Tillage. Tillage is very important in the peach orchard. Even those cranks who believe in growing apples in grass hardly go so far as to apply this method to peaches. The general methods of tillage now widely recognized as standard practice in apple orchards apply also to peach orchards. The ground is lightly plowed early in the spring and receives frequent thorough light surface cultivation up to July 1st or thereabout. During the first half of July a cover crop is sown and allowed to stand until the following spring. The best cover crops for Massachusetts seem to be buckwheat, soy beans, vetch, rye with peas, and rape.

Thinning the fruit. In all the advanced commercial districts

thinning the fruit is now an established practice. In Massachusetts this practice is particularly desirable since we are in a position to dispose of an extra fancy grade of fruit to better advantage than are growers at a greater distance from the market. This thinning should immediately follow the "June drop," that is, it will take place the latter part of June and the first of July when the fruits are about the size of walnuts. It may be desirable to give a second thinning in August, though if the work is thoroughly done at the first thinning a second operation will not be necessary.

Fertilizers. Peach trees need a good deal of plant food. This fact is generally recognized, but the common practice in the fertilization of peach orchards has been notably ignorant and wasteful. Barnyard manure is the least satisfactory of all good fertilizers and in Massachusetts where it can always be applied to other crops it should never be used on peaches. Commercial fertilizers are usually satisfactory, especially when combined with cover crops or other means of maintaining a supply of humus. Probably the best practice for the ordinary farmer and fruit grower is to buy ready mixed complete high-grade fertilizer for his orchards. Those who understand the crop well enough to do their own mixing may use some such formula as the following:

300 lbs. sulphate or muriate of potash and
500 lbs. slag.

These are mixed and are applied to a bearing orchard at the rate of about eight hundred pounds an acre a year. In addition to these each tree should be given one-half a pound to two pounds of nitrate of soda, depending upon general indications.

Insects and diseases. These are not given any extended discussion in this lecture owing to the fact that these subjects have been fully covered by other speakers at this horticultural school. The peach, however, has its full quota of insects and diseases, notably the San José scale, the peach tree borer, the yellows, the leaf curl, and the brown rot of the fruit. Constant intelligent attention must be given to the crop in order to overcome these pests.

Marketing. The great advantage of New England, and particularly of Massachusetts, in the fruit business lies in the superior quality and accessibility of our markets. For the most part peach

growers in this part of the country cater entirely to local markets. There are few cases in which shipments in carload lots are necessary. As long as such shipments can be avoided it is a great advantage to the grower in every way.

Peaches should be quite largely grown in Massachusetts in small plantations as a side line in combination with other fruit or truck crops or with poultry. They should also be much more widely planted as a feature of the family orchard. In such home orchards a dozen or two dozen peach trees will be sufficient and will supply a very acceptable addition to the family diet.

THE POSSIBILITIES OF NUT CULTURE IN NEW ENGLAND.

By Dr. W. C. Deming, Secretary Northern Nut Growers' Association, Georgetown, Connecticut.

Delivered before the Society, March 7, 1914.

To those who have never thought much about it I suppose it seems that there is not very much to learn about a little thing like nut growing; but people who specialize in anything usually find the subject indefinitely broadening out before them.

The success of the pecan in the South, and of the walnut, almond, and filbert on the Pacific Coast, together with the activities of certain individuals and societies, has awakened an interest all over the country in the possibilities of nut culture.

With one or two exceptions there are no commercial nut orchards, no real nut orchards at all, far east of the Pacific Coast nor north of, let us say, Georgia. The exceptions are two small orchards of seedling Persian walnuts in northern New York and a number of chestnut orchards, mostly in Pennsylvania.

The reasons for the neglect of nut growing are several. People have mostly been too busy developing this great new country of ours to think about such little and slowly materializing things as nuts, especially when there have been plenty of pretty good wild nuts to be had for the gathering; and when there was not time nor inclination for that, the hot chestnut man and the corner grocery were handy.

But there are other reasons. Lots of people have planted exotic nuts and been disappointed in the results. Foreign filberts have uniformly gone down with the blight. Almonds have been almost as uniformly sterilized by the cold. Here and there a seedling Persian walnut has struggled through anywhere from 10 to 25

years of growth, preparatory to bearing, and then has borne nuts in uncertain quantity and of uncertain size and quality.

Attempts with the walnuts and hickories to accelerate bearing and convey exact characteristics by the asexual methods, budding and grafting, have been almost always unsuccessful, so that all this has been very discouraging. The man who wanted to grow nuts could get seedling trees of various kinds from the nurserymen, or he could plant nuts, but in either case the chances were that results either would not come in his lifetime or, when they did come, would be practically valueless. It has been slow and hard work getting to the point that we think we now have reached, where we can make progress rapidly and intelligently. Not that the great problems have yet been solved, or that we can advise commercial planting, in this part of the country, at any rate. We are still in the experimental stage. But we are passing rapidly through this stage that on other continents has taken centuries.

The pioneer nut growers of the southeastern United States have shown us the way. They have selected the one wild pecan in ten thousand worth keeping, preserved it by grafting or budding, forever unchanged, and have built up on a certain foundation an industry that is today, when ideally managed, as it often is, the equal of almost any standard form of investment.

One of the objects of the Northern Nut Growers' Association is this same preservation of our fine types of northern nuts, that year by year are passing out of existence, and that, with our diminishing forests, are not being replaced by nature. There are not a half-dozen of our native northern nuts that are now preserved by asexual propagation. I urge you who may know, or in future learn, of native nuts that ought to be preserved by propagating, to send specimens of such nuts, with a description of the tree, to some officer of the Northern Nut Growers' Association, or to the Pomologist of the Department of Agriculture at Washington.

We have reached the present state of our knowledge of nut culture chiefly because we have learned how to propagate the walnuts and hickories. Doubtless there were men before the Christian era who could graft the walnut. It has been done in other countries probably for centuries. As the hickory, however, is native only on the North American continent it is safe to say that its

propagation by budding or grafting is of very recent origin. We, in the eastern and northern states, are indebted to the walnut growers of California for our first knowledge of methods of propagating that nut, and to the pecan growers of the South we owe the working out of the methods of budding and grafting the pecan that seem to be applicable to all the hickories, and to the walnuts as well.

But it must not be thought that these methods have been, or probably ever will be, made easy for the person of mental or physical indolence. It is said that one may throw a peach bud at a peach tree and if it hits it will stick and grow. It is easy to bud and graft the apple. But an expert at these things might fail to get a single bud or graft to take with walnuts or hickories, while an expert pecan budder has been known to have a thousand successes with a thousand buds.

If it had not been for the difficulties of propagation probably we should see today, here in the East, many fine orchards of named varieties of nut trees, such as, it is no vain thought to hold, we shall actually have in the not far distant future.

Descriptions of these methods of propagation must be sought in special articles with suitable illustrations, and carefully studied and practised, or, better, learned from a master hand. In a general way it may be said that walnut and hickory buds and grafts are so slow in uniting that a large amount of vigorous and sappy tissue must be transplanted to hold the life of the bud until union is made. It has recently been observed that grafting wood up to six years of age may succeed, for this reason, where wood of one season's growth might fail from lack of sufficient substance. The utmost dexterity in cutting the buds and scions must be acquired to insure accuracy of fit and speed in reducing to the minimum the exposure of the cut cambium layers which rapidly lose their vitality on contact with the air.

The stocks should be in a condition of active growth and the scion buds perfectly dormant. The buds and grafts must be properly protected with waxed wrappings or with paper bags. Pure beeswax is said to be much better than the ordinary grafting wax, the oil in which is harmful to the cambium cells.

We are now, I think, in a position to make the following general

recommendations to the person who wishes to grow nut trees in this part of the country.

Concentrate your thought and labor on getting established, in the best possible condition, a few, two to four, grafted or budded trees, if they are obtainable, of each of the varieties that you wish to grow. The walnuts and hickories are difficult to transplant, especially when of a size great enough to allow of their being grafted or budded, and are slow to become established. They will need all the care you can lavish on them. Loosening the subsoil with dynamite, being sure that the soil is afterward compacted again, is apparently good practice. Acid soils will need lime, especially for the walnut. They must be given frequent and deep watering in dry weather, particularly the first season, be kept free from weeds, bud eating, stem boring and leaf rolling worms, and have cultivation, fertilization, and winter protection until well established. After that they may grow with astonishing vigor. Many an exotic is so only in babyhood.

While establishing these few choice trees, grow also seedlings from the best nuts obtainable, thousands if you can, in nursery rows. These to be later grafted, budded, or otherwise experimented with. If allowed to fruit, one in many will be worth propagating, and now and then a grand prize will be drawn.

Were the industry established, as is walnut growing in Oregon, we might adopt the method advised there, of planting sprouted nuts in holes dynamited in their permanent places, one-half the resulting trees to be grafted as early as possible, the other half to be allowed to grow as seedlings, to help pollinate the grafted trees, to furnish new varieties when they fruit, and later, if undesirable, to be top worked.

The grafting and budding you should learn to do yourself, to get the full satisfaction of the work, but it will not be long before we shall have men who will do this for us if we wish.

Judging by the questions asked me by correspondents I know that many of you are likely to feel discouraged by my statements. Many persons write asking the questions a methodical person would who wanted to start a peach or apple orchard; about varieties, cost, treatment, time of bearing, markets, and profits. These questions cannot be answered. The joy lies in finding out many

things for yourselves. If you want sure profits you had better follow established methods in peach or apple growing. There are no established methods in nut growing for us here, as yet. We know just enough about it to set you on the way to success with the fundamental and expensive mistakes eliminated.

I am sorry to say that extravagant claims have been, and are being, made as to the hardiness and productiveness of certain nut trees. Most nurserymen make such claims for most of their trees, and we have learned to make allowance for that, but the promoters of certain nut trees, taking advantage of the popular interest and ignorance, are making claims which they cannot fail to know are not only improbable but impossible of fulfilment. Already many people have been fooled and have become very shy of any advocacy of nut planting. The nurserymen are killing their own industry by making unproved claims for hardiness, productiveness, ease of culture, desirability of nut, and so on. They do not mention the fatal filbert blight and the chestnut bark disease which render the culture of these nuts all but impossible; and in some instances, I regret to say, nurserymen have sold seedling trees at the price of, and with the understanding that they were, grafted trees.

In recognition of these evils the Northern Nut Growers' Association at its last meeting passed a resolution of which the following is an abstract.

"Resolved, that the secretary of the Northern Nut Growers' Association be instructed to keep an accredited list of northern nut nurserymen, such list to be made up by the Executive Committee of this Association of such nurserymen as the secretary may feel satisfied make no misrepresentation as to whether the trees they sell are budded or grafted varieties, or as to the specific varieties which they sell, or any other statement calculated to mislead the purchaser to his detriment.....Such accredited list of nurserymen shall be furnished anyone on request."

The greatest field for scientific nut growing is that of hybrids. There seems to be almost no limit to the possibilities, even without resort to unnatural methods. All the walnuts will cross with one another and with some of the hickories. The hickories all mutually cross. As there are thirteen species of the hickory and three more well-marked varieties, and perhaps as many of the walnuts, the possibilities are evident.

There is a natural cross of the pecan and the shagbark hickory called the "hican." It is a big hollow mockery, but it does not follow that there will not some day be a cross between these two nuts that will be a dream of perfection.

Any one with the time and inclination can make brand-new kinds of nuts. Some one may make one some day so good that no one will think of planting anything else for shade and ornament, because at the same time it will provide food and income. Let us replace our dying elms and other "bunches of leaves" with trees as beautiful and infinitely more useful. There are good ones to begin with, though not the best that we expect. A tree was recently found by one of our members in a dooryard in the city of Lancaster, Pa., that bears the handsomest Persian walnut I have ever seen, selling in the markets of Lancaster for fifty cents a pound. It is said to be a good annual bearer and to be perfectly hardy. If Boston Common and the yards of Cambridge were lined with trees like this, a policeman under each would be none too many.

A measure of the growing importance of nuts as food is furnished by the amount of the importations of nuts and nut products into the United States. The following table shows the value of the imports of nuts into the United States from 1908 to 1913;

1908	$ 9,643,943
1909	8,664,253
1910	13,246,742
1911	14,498,413
1912	15,828,003
1913	13,979,905

It should be our aim to reduce these large figures rather than to have them pretty steadily and rapidly growing. But their growth shows the growing importance of nuts as food. This includes tropical nuts and products that we do not, and perhaps never can, produce in quantity or profitably. But an increased production of other nuts that we can grow would lessen the need of the importation of tropical nuts.

No one has to be told how good nuts taste and how many ways there are of using them as food. The concentration of the nourish-

ment in nuts is too little known, or too often ignored. For example, peanuts are nearly three times, and hickory nuts more than three times as nourishing as beef steak. When you think of it that way it hardly seems to be the thing to munch, casually, triple extract of beef steak from a street peanut stand or after a hearty meal. The bad reputation for digestibility that nuts sometimes have is due solely to this fact. Nuts properly chewed are very digestible. Nearly all the nuts are very rich in protein and oil, up to as much as 30% in protein, which is richer than cheese, and up to 70% or even 80% of oil, which is twice as rich as cheese, our idea of a highly concentrated food. It is plain that food could hardly be more concentrated than is the meat of the butternut, shagbark, or pecan. The chestnut alone has a high percentage of starch, about 70%, and of course a much smaller percentage than the other nuts of protein and fat. Nuts should have, and must have, greater recognition and use as a highly nourishing and palatable food. "Bread, butter and beefsteak are furnished by nuts, in a nutshell, in tablet form, in sealed individual packages, water-free, concentrated and uncontaminated. Yearly seeding, daily milking, or butchering are not required."

I wish not to let pass the opportunity of speaking of the Northern Nut Growers' Association. This society was organized in 1910 for "the promotion of interest in nut producing plants, their products and their culture." It aims to be educational, is entirely non-commercial and there are no salaried offices. Among the founders were Dr. Robert T. Morris of New York, the late Professor John Craig of Cornell University, and Mr. T. P. Littlepage of Washington, D. C. Another of its objects is the preservation and perpetuation by asexual propagation of our valuable native nut trees. The secretary will be glad to furnish literature and give any help that he can to persons interested in nut culture. He will also be glad to receive information about valuable nut trees.

Let us now take up the different kinds of nuts, and consider first, for the sake of completeness, those about which there is the least to say.

The Pistache or Pistachio. This familiar confectioner's nut is grown on the Pacific Coast. It is being tried here by private and government experimenters. At present there is no more to be said.

Pine Nuts. These are purely for experiment. There seem to be latent possibilities in them and for a young man with money here is a promising field.

The Almond. The best types of these nuts are grown on the Pacific Coast and men are making good incomes from them on a small acreage. The hard-shelled almond will grow and fruit here but those who do grow it have not communicated a great deal of enthusiasm about it to others, except that its flowers are praised. So far as I know nobody is fruiting the soft-shelled almonds east of the Pacific Slope. You can buy several varieties, with beautiful French names, from some of the nurserymen, but those that are bought seem never to be heard of again. The reason given for the lack of success with the almond is that it is too tender for our winters and that it blooms so early that it is caught by the late spring frosts.

Here is the opportunity of the man who wants to plant nuts. Let him raise thousands of almond seedlings and it would be indeed surprising if variation did not sometime highly favor him. We ought to, and I believe will, have varieties that can grow where the peach will. It is of the peach family and is usually propagated on peach roots.

Filberts. The filbert is one of the tragedies of nut growing. Very hardy, easy to grow and propagate, early in bearing, of good quality, it is the 'quick results" nut, but alas, every planting in the East of the fine large foreign filbert goes down sooner or later with a blight to which our small native hazel is immune. Careful spraying with Bordeaux ought to hold this in check but there seem to be no recorded, long-time experiments. Anyway we don't want to grow nut trees whose very existence depends on systematic spraying. The thing to do is to work for an immune variety. Our native hazel thickets must be searched and seedlings raised, but above all crosses made between the large susceptible foreign, and the small immune native, hazels, with the object of creating a large immune variety. Such experiments are under way.

The Chestnut. This is the other and the great tragedy of the nut world. It differs from that of the filbert in that the blight of the filbert is native and seriously attacks only the imported nut.

When we stop importing the nut the disease stops. But with the chestnut it is the disease that is imported and it cannot be deported. The native chestnuts, and the European chestnuts grown here, seem to be doomed. At any rate no one should set chestnut trees except with full knowledge that they are almost certain to be attacked. Some growers seem to have been able to keep this disease in check in large orchards by constant watchfulness and prompt and energetic treatment, similar to that employed against pear blight. With this understanding the planting of a few trees may be recommended. But if neglected their destruction is almost certain. The statements of nurserymen who have these trees to sell would lead one to think either that the blight is a negligible thing, or that their trees are immune. So far as I know there is but a single nurseryman who even mentions the chestnut blight.

But a light of great promise is breaking for chestnut growers. Dr. Van Fleet, of the Department of Agriculture at Washington, by crossing the practically immune native chinquapin and the Japanese chestnut has produced an immune nut of a size approaching that of the Japanese and with the high quality of the chinquapin. Moreover this chestnut has borne nuts in the second year from seed and appears to bear increasing crops annually. Herein lies our hope, but these trees are not yet available.

Several deaths in Connecticut have been ascribed to eating chestnuts from trees affected by the blight. These cases are not yet authenticated but it is a thing that may be safely remembered, especially as it has now been shown that the blight attacks the nut itself as well as the bark and wood of the tree.

The Hickories. Of the thirteen species of hickory we need to consider but two, the shagbark, *Hicoria ovata*, and the pecan, *Hicoria pecan*. The shagbark needs no introduction to Massachusetts people. You all know how desirable it is at its best and what a pesky little thing it is at its worst. One would think that the difference would have induced improvement, in the average at least, by selection and propagation. But it is not so. We are still dependent on our chance native trees for all our shagbarks. Many people can be run across who will tell you what big fellows grew on a tree on father's farm, now cut down, of course, but mighty few have had the gumption even to plant the nuts. One man only,

so far as I know, who had a fine tree, worked for many years of his life to have his nut propagated and disseminated. This was Mr. Henry Hales of Ridgewood, New Jersey, who died last November. He finally had success and his shagbark hickory is practically the only grafted one on the market.

The few grafted shagbark hickories that have come into bearing have been discouragingly slow in doing so. But it does not follow that all will be so. In fact if we can draw inferences from the behavior of that other hickory, the pecan, top worked hickories should bear by the third or fourth year. This seems to offer the opportunity to top work, by grafting or budding, our native young hickories. In the dormant season trees of any species of hickory, and up to a good many inches in diameter, may have their limbs amputated near the trunk where they are not over three inches through. The resulting strong shoots may be budded the following summer or grafted in the spring after that. But this will need an expert. Immediate grafting also may be practised if the limbs are cut off soon after growth starts.

The Pecan. Those of you who are familiar with the modern pecan of the South, and probably few of you are, as down there they don't let many of them get far from home, know to what a state of near perfection they have brought this delicious nut. To my taste there is no nut so good. But we cannot grow the southern pecan here. What we think we can grow, however, is the Indiana pecan, native in the southern parts of that and adjoining states. This pecan, while not quite so large as the southern, yields nothing to it in quality. Several grafted or budded varieties of the Indiana pecan may now be bought of several nurserymen, and it is recommended by the Northern Nut Growers' Association for trial.

Not long ago I saw in Hartford, Connecticut, a pecan tree that is nine feet and three inches in circumference, breast high from the ground. The nuts on this tree do not fill, probably from not having a growing season long enough to mature them. There are a number of other pecan trees scattered over the North that show us that even the southern pecan may produce individual trees that endure our climate.

The Walnut. The Japanese heartnut, *Juglans cordiformis*, grows in Japan on the mountains where they have snow every

month in the year. It seems to be very hardy, grows rapidly, makes a beautiful tree, and bears young. The nut is pretty good and easily cracked from the shell. It is to be recommended but care must be taken not to get a similar tree, *J. Sieboldiana*, much pushed by nurserymen, but the nut of which is very inferior.

Our native butternut and black walnut can be grown almost anywhere. One must be content with seedlings however for there are no propagated trees. In fact nobody seems to have made known a tree of either of these nuts sufficiently superior to be worth propagating. This is unfortunate. We need badly a good butternut. This need not necessarily be thin shelled but should crack fairly easily and the meat come out in unbroken halves.

As much may be said for the black walnut. We need one especially that lacks the usual strong flavor and that falls easily from the cracked shell.

The nut most in the public eye just now is the so-called "English" walnut. It has been called the French, Italian, European, and Madeira walnut, and many other names. The most approved is Persian though the latest is Circassian. If we could just make it plain walnut what a simplification it would be. But that would confuse our Connecticut folks who commonly refer to the shagbark hickory as the walnut.

I have been making an investigation of the Persian walnut trees in the East and it is astonishing to learn how many of them there are. Many are in localities favored by proximity to large bodies of water, but not all of them. They are all seedlings bought from nurserymen or grown from nuts, planted where they stand. Many bear small, thick shelled, or bitter and astringent nuts, but some of them bear nuts the equal of any that we get.

Most trees are reported from the region south of Lake Ontario in the great fruit belt, beginning in Ontario on the Niagara Peninsula and extending past Rochester. Hundred of trees are reported from this region. One man has an orchard of 225 bearing trees, 27 years old.

But there are trees scattered over Massachusetts, Connecticut, and all the states as far south as Georgia. There is one at Newburyport, Mass. and another at Roslindale.

I hope in time to trace out almost all these trees that are of any value.

The best of these trees have been propagated and you can buy them from a few nurserymen who specialize in nut trees. They are to be recommended for trial but should be given the special care that I have before spoken of. They are expensive and it is disheartening to lose them. Most of them are lost through neglect in the first two years.

It is better to grow seedlings than no nuts at all and better to grow these from nuts selected by yourself from known trees. At any rate don't set big trees, don't pay extravagant prices for seedling trees, and don't buy seedlings thinking that you are getting grafted or budded trees. In case of doubt the Northern Nut Growers' Association or the United States Department of Agriculture will be glad to advise you.

UNDESIRABLE FOREIGN PLANT DISEASES.

By Dr. Perley Spaulding, Washington, D. C.

Delivered before the Society, March 21, 1914.

The John Lewis Russell Lecture.

So much is made of the conservation of our natural resources that the present day might be called the age of conservation. In this connection we hear a great deal about the saving of human life; the prevention of sickness; the limitation of working hours for women and children; of our rapidly decreasing coal supply; the necessity for retaining large water powers in public control; the need for conserving our dwindling timber supply; the prevention of the extinction of many big game animals, game birds, aigrette herons, etc., etc.; but in all this discussion we seldom or never hear of any sort of concerted action to reduce the immense loss caused to agriculture, horticulture, and forestry by the multitude of parasitic fungi which attack the crops of our fields, forests, orchards, and gardens. While we all know in an indefinite way that the loss from parasitic fungous diseases is great in the aggregate, we have unfortunately a very hazy and indistinct idea of the economic importance of such diseases. A few specific items showing the estimated loss to some of our most important crops from this cause may perhaps give us some notion of their really great importance.

The Economic Importance of Plant Diseases.

While considering these losses it must be borne in mind that plant pathologists have originated methods of reducing these losses in

most cases to a point where they have not continued to be disastrous. It was estimated that the Anaheim disease of the European varieties of grape caused a total loss of twenty million dollars, in the southern part of California (1, 2) in the decade from 1884 to 1894. It practically destroyed the grape industry within the diseased area. The American grape mildew, when introduced into Europe about 1850, reduced the crop in some sections of France to one-tenth or one-twentieth of the normal yield. The situation became so serious that many people emigrated from the worst affected areas (3). East of the Rocky Mountains the principal grapes grown are American varieties. A conservative estimate of the annual loss due to the diseases of the American varieties shows that there is an average loss of between five hundred thousand and one million dollars. But such losses as these are not limited to single crops, but may be paralleled with a great many of our more important crop plants.

The bitter rot of the apple was estimated by a competent authority to have caused $10,000,000 damage to the apple crop of this country in the single year of 1900 (4). The pear blight, during the years 1904 to 1909, destroyed over five million dollars' worth of pear orchards in California (5). The peach leaf curl was estimated to have caused $2,335,000 damage in the year 1900 (5). The California peach twig blight has for several years caused a large loss in the crop of California peach orchards. Efficient methods of treatment devised for this disease are already saving more than a million dollars a year (5). The brown rot of peaches, plums, and cherries is present practically everywhere these fruits are grown, and causes great total loss, the loss often reaching as high as 25 to 50 per cent of the total crop. The estimate has been made that the annual average loss in this country from this disease is five million dollars or more. The small fruits, aside from the grape, have a considerable number of serious diseases which often destroy from 10 to 50 per cent of the crop (5).

About a generation ago there was a very valuable and productive coffee industry in the Island of Ceylon. The coffee leaf rust practically wiped out this industry and caused a total loss in Ceylon estimated at $85,000,000 (6, 7, 8). In the Philippines the coffee crop was reduced 35 per cent in 1891 by this disease; in Java the

crop was reduced one-third during the years 1884–1888; in Madagascar the coffee industry was ruined as a result of the rust being sent there in coffee trees from Ceylon. The disease is present through the Old World coffee districts, but is still unknown in the New World. Great care should be taken that it does not reach the coffee growing regions of the Western Hemisphere, for if it once gets established in a single place it will be almost sure to spread throughout our coffee plantations, as it has done in the Old World.

In Prussia alone, the rust of wheat, rye, and oats was estimated to have caused a loss of $100,000,000 in 1891 (7). The wheat crop of 1890–1891 in Australia was injured by rust to the extent of $12,500,000. The wheat rust was estimated to have done $67,000,000 damage to the crop of this country in 1898 (9). In 1904 a serious outbreak of this disease occurred, and in the three states, North Dakota, South Dakota, and Minnesota, the loss for that year was estimated at about $15,000,000 (10). The average annual loss from wheat rust in the entire country is set at fifteen to twenty millions of dollars (10, 11). The annual loss from the smuts of wheat and oats is estimated at about twenty million dollars in this country (5).

A damage of ten million dollars was done by the potato blight in the single State of New York in 1903 (12). It is estimated that the average annual loss from potato blight in this country is $36,000,000. It has been estimated on good authority (5) that not less than 10 per cent of all our principal horticultural and agricultural crops is annually destroyed by parasitic diseases. The estimate of the value of these crops for this country in the year 1912 is $6,137,000,000 (13), thus giving a total loss for that year of $613,700,000. The statement has also been made that the annual loss from the diseases of cultivated crops the world over is approximately one billion dollars, but the remark is added that it is probably double this amount if all loss from this cause could be definitely ascertained (7).

But this loss is not limited to our cultivated crops. In certain national forests of the Northwest it has been estimated that 75 per cent of the total stand of certain species of trees is worthless because of the attacks of wood-rotting fungi. Species which are known to be thus seriously affected in certain localities are aspen

(*Populus tremuloides*), western hemlock (*Tsuga heterophylla*), grand fir (*Abies grandis*), and mountain pine (*Pinus monticola*). The speaker personally knows that the hardwood forests of certain sections of the Adirondacks are in very bad condition, and in lumbering operations which covered a large area there some years ago it was found that the amount of useful hardwood timber was actually much less than the estimates had led the contractor to expect.

The chestnut blight alone was estimated, in 1911 (14, 31), to have caused a loss of twenty-five million dollars in this country. This disease has spread steadily on its devastating course, and what the loss may be at the present time no one can say. Were the actual facts known it would be found that a very considerable percentage of the stand of lumber in this country at the present time is useless, because of disease; that is, these diseases are not limited to the above-mentioned localities only, but are generally distributed and are exacting a large, although little appreciated toll from the forests of the entire country; and this is true not only in this country but in practically all forested regions which are not under intelligent supervision.

But the loss caused by these diseases is not entirely a pecuniary one. The chestnut blight probably has caused as great loss in its destruction of ornamental and shade trees as it has done in actual destruction of timber of our forests. The potato blight, during its first outbreak in Ireland during the '40's, caused a very large loss of life (16). The influence of this disease is felt even to the present day in this country. It may truthfully be stated that the potato famine in Ireland, caused by this disease, has undoubtedly had a very potent effect upon the politics of this country, since it was the direct cause of the great immigration of the Irish to this country which began at that time.

Some Plant Diseases Which Have Emigrated to New Regions.

In order to gain some idea of the extent to which fungous plant diseases have been carried from one part of the world to another, it may be well to consider here a few specific instances of this sort. The potato blight already mentioned was undoubtedly a native of South America (16). It appeared in Europe and North America

at practically the same time, about 1840. The period during which the potato has been cultivated on these continents had resulted in the development of many new varieties, and quite likely had brought about a very considerable change in the character of the potato plant from its original South American type. These changes carried on in the absence of the disease for a long period undoubtedly had much the same effect upon the progress of the disease as would the presence of a new susceptible host. The result was, as you all know, one of the most disastrous outbreaks of plant disease known in the history of the world.

The American grape mildew was native in this country upon the wild species of grapes, but it caused comparatively little harm (3). It was first discovered in Europe in 1845. It spread rapidly and in the '50's devastated the vineyards of France and the Mediterranean region, causing a tremendous loss. It is at present known in practically all the large grape growing regions of the world.

But we do not have to go back of recent years for instances of the introduction of fungous diseases into new regions. Such emigrations are constantly going on. As recently as 1900 the American gooseberry mildew was first discovered in Europe (17). It is present in practically all of Europe, and even Siberia, at the present time. Serious efforts to control this disease were not undertaken until it was already too late to hope to prevent its spread. Moreover, it spread simultaneously from three different centers of infection which were very widely separated. The European gooseberry is seriously attacked in this country by this disease, and the situation in Europe is rapidly becoming quite similar.

The hollyhock rust was first known in Chile in 1852, where it was apparently native (18). In 1869 it was first found in Europe. It has since spread practically over all Europe and North America, and is present in Australia. In Europe it has attacked practically every wild species of the hollyhock family, in many localities completely exterminating both the wild and cultivated mallows.

The asparagus rust was present in Europe over one hundred years ago (19). It was known to be present in the United States in 1896, and for a number of years thereafter a very serious epidemic of the disease spread over the country. I hardly need make any statements of the damage done by it.

The oak mildew, which broke out in a very serious epidemic during the years 1907 to 1910 in Europe, is apparently a case of a newly introduced disease there. It spread over all Europe and extended even into Asia Minor. It attacked the European oaks worse than those of other continents. It is not yet definitely known where the disease originated.

Other diseases which undoubtedly have been carried from one region to another are some of the grain rusts and smuts which have accompanied their hosts all over the world; the carnation rust which has spread practically over this country; and the olive knot very probably came to California in the early days of the Missions, along with its host. Certain ornamental bulb diseases are known to be widely distributed over the world, and there can be no doubt that they have accompanied their hosts from the native home of the latter. The chestnut blight, which is now known to be native in the interior of China (35, 36, 37, 38, 39) has, as you know, spread well over the eastern part of this country. Moreover, it has been found present in British Columbia, and there is a strong likelihood that it may be present on the Pacific Coast. It is carried in nursery stock and sometimes probably in diseased nuts (40). The white pine blister rust, which is probably native in western Siberia and eastern Russia, has spread practically throughout Europe, and, as you know, is present in North America.

These instances, which are all a matter of history, and which are but a few among the many which could be mentioned, certainly should be sufficient to convince the most skeptical person that these diseases have been carried extensively from their native homes to new regions, and that such emigration is constantly going on to an extent which is entirely unsuspected by the public.

Diseases Threatening to America at the Present Time.

With such plant disease emigration constantly going on it must occur to the most thoughtless person that there are certain new diseases which are likely to be introduced into this country with just as disastrous results as has attended the introduction of some of the above-mentioned ones. As a matter of fact, there are a

large number of such diseases which may be brought to this country in imported plant material and which may become very destructive here if they are introduced. It might seem to some that we have already received all such diseases that could possibly be brought to us, but this is far from being the truth. The rapidly increasing volume of imported plant materials received in this country which originates from the four quarters of the globe, and which is coming to a greater and greater extent from new countries with which ready intercourse has not before existed, renders us more and more liable to import diseases about which we know little or nothing at the present time.

Moreover, our florists are constantly introducing new choice ornamental plants. Similarly, our horticulturists are introducing new fruit-producing plants, and our agriculturists are testing and planting on a large scale new varieties of forage plants, vegetables, and cereals from the most diverse parts of the world. In fact, at the present time a very marked movement is in progress to secure for the farmer, horticulturist, and florist of this country all of the different useful plants of the other countries of the earth.

The United States Department of Agriculture has an Office of Seed and Plant Introduction for the express purpose of securing new kinds of plants from all parts of the world with a view of testing them and introducing to cultivation those which promise to be of value. A very important part of the duties of this office also is to secure plants for experimental use by investigators who are originating new and more valuable varieties of plants, or who are working out the complete life history of a new disease. For instance, in the experimental work upon the white pine blister rust an effort has been made to secure every species of pine in the world so that tests may be made to prove their susceptibility or immunity to the disease. In the breeding of new varieties of asparagus resistant to the rust all the varieties of Europe were secured and tested before the actual breeding work could be begun (15).

The securing of these diverse species and varieties of plants from all quarters of the world, however, is always accompanied by the danger of introducing foreign diseases of these plants along with the plants themselves. A special inspection is maintained for the purpose of preventing the introduction of such diseases, and it is not

overstating the truth to say that dozens of dangerous new diseases are intercepted every year. Some examples of diseases which are likely to be introduced into this country very shortly may be cited. There is a rust of the canna in Europe, which, if not already present in this country, is likely to come to us sooner or later. The alfalfa has been found in one or two parts of this country to be affected with root wart, which is known to have come to us from Europe. The black wart of potato tubers has been known for a number of years in Europe, and is known to have already become established in Newfoundland and some adjacent islands. It is not known to occur in this country. The powdery scab of potato tubers is another European disease which has been discovered in Canada and also to a limited extent in this country. In Africa the mango was recently reported to be affected by a serious new bacterial disease of the leaves and fruit. The gladiolus is known to be affected with a bulb smut in Europe. Indian corn is seriously attacked in Java and India by a downy mildew. In fact, we might go on enumerating similar diseases of practically all of our cultivated plants, but these few instances will serve to emphasize the point that I wish to make, namely, that we are in constant and increasing danger from serious foreign plant diseases, and this danger is really much greater than the public believes can be possible.

One point in this connection that is not generally understood is that a fungous disease may become much more virulent in its attacks upon a new host or when carried into new climates. Hence the seriousness of a disease in another country is no index of its seriousness in the United States, or vice versa. A disease that is of no consequence in South America or in Asia may become very destructive in America. In fact, this was the case with the potato blight and the chestnut blight. Also, it should be mentioned that a parasitic fungous disease that is once established in a new country is a permanent factor in that country forever after.

Methods of Combating Plant Diseases.

The science of plant pathology is one of the youngest among those which directly affect everyday life. It is scarcely more than a generation old. For this reason, perhaps, it is in a state of intense activity and growth, and it does not seem to be hampered by

hidebound precedents which usually accompany old age. There is a disposition on the part of the plant pathologist to use any and every means possible in controlling outbreaks of parasitic diseases and in preventing such outbreaks. In considering the various methods of combating parasitic diseases we may divide the subject into two heads, namely, methods of controlling outbreaks of disease, and methods of preventing outbreaks of disease. A brief consideration of the methods in use may perhaps be useful.

Methods of Controlling Outbreaks of Disease.

In subduing outbreaks of disease most use is perhaps made of various forms of dust and liquid spray mixtures. This, in fact, is a field in itself, wherein a great amount of experimental work is being carried on every year. In certain European forests, removal of the sporophores of the large wood-rotting fungi from the living trees is an efficient way of preventing infection spreading to adjacent trees. The removal of plant parts bearing the fruiting bodies of the parasite is also an efficient method of controlling outbreaks. Under this heading would come the removal of pear twigs killed by the pear blight organism. Another method of preventing the spread of certain fungi which require two distinct hosts for the completion of their life history is the removal of one of the complementary hosts from the locality where the disease is present; for instance, the removal of cedars from the vicinity of apple orchards to stop the outbreak of the cedar-apple fungus upon the apple leaves.

The Prevention of Outbreaks of Disease.

While noting the subjects treated by various lecturers upon plant diseases here the speaker was struck with the unanimity with which they have emphasized the prevention of outbreaks of plant diseases, nor is this agreement in opinion at all to be wondered at. This is a cardinal principle in dealing with diseases of man and animals. In nearly all lines of investigation of plant diseases it has come to be recognized that the really efficient method of treatment of plant diseases is that which prevents extensive outbreaks of such diseases.

Among the various methods of preventing outbreaks of disease

may be mentioned: The spraying of fruit trees while in dormant condition to kill spores sticking to the trees; the removal of diseased plants and parts of plants during the dormant season; the sterilization of seed with suitable fungicides to kill adhering spores; the antiseptic treatment of wounds in woody plants to prevent the entrance of wood-rotting fungi; the separation of complementary hosts of parasitic fungi requiring two distinct hosts to complete their life history; the avoidance of localities or conditions favoring certain diseases; the avoidance of planting large, continuous areas to the same crop, which gives a disease excellent conditions for spreading; the sterilization of soil in limited areas; the use of large and strongly viable seed; and the development of varieties resistant to disease.

Up to a very short time ago these comprised the methods of preventing disease outbreaks that were utilized in this country. Until 1912 one of the most efficient means of safe-guarding the forestry, horticultural, and agricultural interests of this country was practically ignored — I refer to national quarantine, which, because of its very recent enactment, many be considered an unused method of combating disease outbreaks in this country. Practically every country in the world has had for a number of years a national control and regulation of the importation of plants from other countries with a view to preventing the importation of destructive insects and parasitic fungous diseases. As previously stated, this country in August, 1912, finally enacted such national legislation for the regulation of importations of plants, but this was not done until the most destructive forest and orchard disease known anywhere in the world at the present time was permanently established here, and we had already received one of the most destructive diseases of our white pine from Europe. I refer to the chestnut blight and the white pine blister rust.

Plant Disease Quarantine.

It may be well to give some attention to what has been done in this country in the way of quarantine of plant diseases. What was in effect a quarantine against wheat rust was undertaken by the colony of Massachusetts by means of the barberry destruction

law in 1755. It may be interesting to those present to know that somewhat similar action has just been taken by the states of Virginia and West Virginia against cedars in apple-orchard districts. In Virginia the matter is one of local option, but in West Virginia it is a general law applying to the entire state. It may be remarked that if the cedars are cut in these states the loss will be much larger than would be sustained if every white pine plantation in the country known to be diseased with blister rust were to be totally destroyed according to my earnest recommendations. Undoubtedly the State of California was the leader on this continent in actual quarantine of plant diseases. I have, however, been unable to find out at what time the first definite disease quarantine was undertaken by that state. It is well known that such a quarantine has been enforced for a number of years and that the inspection has been comparatively rigid.

In 1910 Canada passed "An act to prevent the introduction or spreading of insects, pests and diseases destructive to vegetation." This was a result of the recent introduction of the white pine blister rust and the potato black wart. At about the same time there was instituted in the Rogue River Valley of Oregon what was in effect a quarantine against orchard diseases. The orchardists of that valley formed an association, taxed themselves for the running expenses, and hired an expert plant pathologist to aid them in a general fight against orchard tree diseases. The valley is isolated, being a rather narrow body of cultivated land bordered on either side by forest land. Because of its relatively isolated position it was feasible to undertake measures there which otherwise could not have been carried out. The pear blight, which is a very destructive disease upon the Pacific Coast, was partly the cause of this action being taken, but the work widened out under the efficient direction of the pathologist, Mr. O'Gara, until it included practically all orchard diseases. Especial emphasis was given to frost fighting in the orchards, and for the past four years there has been practically a rigid quarantine against orchard diseases in this valley. This experiment — for such it is, since it is the first known instance of the kind — has apparently been very successful.

In 1911 Pennsylvania passed a law giving to the Chestnut Tree Blight Commission quarantine power over the chestnut blight and

full power to enforce control measures against it, even to the destruction of diseased trees. This is practically a dead letter at present through the lapsing of appropriations to carry on the work. In 1912 your own state put into effect an absolute quarantine against the importation of any five-leaved pines into the state from Europe, because of the white pine blister rust. A little later in the same year our National Congress passed a plant disease quarantine act, which was the first that this country has ever had. The provisions of this act are administered by a body known as the Federal Horticultural Board, consisting of five members who are appointed by the Secretary of Agriculture from the Bureaus of Plant Industry, Forest Service, and Entomology of the Department of Agriculture. Not more than two of these members can be appointed from any one Bureau. This Board puts into effect, under the approval of the Secretary of Agriculture, such measures as are decided to be most expedient. The passage of the bill came as a surprise, and necessitated quick action on the part of the Secretary of Agriculture and the Board which he promptly appointed to set the machinery in motion. More or less friction necessarily developed before a routine was established, but much of this has been eliminated since the beginning of actual work.

International Trend of Plant Pathology.

It is generally acknowledged that this country is the leader in the practical control of plant diseases, and in the investigation of problems relating thereto. To such a point have we progressed that this is the day of specialists in plant pathology, as is the case in many other sciences. The early pioneer work has largely been done, and we are now attacking the more difficult problems, which necessarily had to be left in early years because of the lack of time, means, or knowledge to solve them properly. Our horizon is widening in every direction, so that diseases which were considered to be thoroughly worked out years ago are being reinvestigated from new view points with surprising results. Our great need at the present time is more intensive research, sometimes along lines which, to the practical man, have no bearing upon economic problems. It is very difficult to secure money for carrying on such

research, and yet it is absolutely essential to the permanent progress of our science.

A fact which is becoming more and more evident with the advance of pathological work in this country is that the investigator or institution that is isolated geographically or by an exclusive policy is working at a great disadvantage. "Team work" is just as effective in plant pathology as it is in any of the sports or in any other line of endeavor. The great progress of the Bureau of Plant Industry during late years is undoubtedly quite largely due to team work within that Bureau (20). And what is true of the Bureau is even more decidedly true of the Office of Investigations in Forest Pathology of that Bureau, of which the speaker was formerly a member. Since the beginning of work of that office in 1907, there has been a very marked coöperation and pulling together of the members of this office, together with personal credit for work done by individuals, which has made possible much of the progress that has been made in the investigations carried on by it.

In plant pathology we are in much the same position as is the case with the civil government of this country, that is, each state has its local government which has its own limits of operation and application. But the Federal Government is necessary to handle cases which affect more than one state, or which affect all the states. In the same way, each state carries on its own investigation of plant diseases within its borders, but it is necessary to have pathologists who are not limited in the scope of their operations to any one state, or even to any one country. Plant diseases are not limited in their distribution by state borders or international boundaries. In order to secure the best results, the pathologist must work out his problems wherever the conditions are best for securing results, regardless of whether the locality is within this country or not (21).

The whole tendency of plant pathology at the present time is very strongly in the direction of international coöperation. The recent national quarantine of plant diseases has rendered necessary an exact knowledge of the distribution of the various plant diseases within our own country. This is accomplished by means of plant disease surveys. Such a survey has been carried on by the Bureau of Plant Industry since 1898 (22) with increasing efficiency. It is hoped that this survey work may be more extended and made to

cover the country in a much more thorough manner than has ever yet been possible. The forest tree diseases are being surveyed by the Office of Investigations in Forest Pathology, this work having been carried on there from the beginning in 1907. The great fact which has been ascertained through these surveys is that we are greatly deficient in our knowledge of the occurrence, even of the common plant diseases, in different years throughout the country. It becomes necessary, because of the frequency of disease in imported plants, for us to know not only the distribution of these diseases within our own borders, but in all the countries of the world. What is true of our knowledge of the plant diseases of this country is even truer with respect to foreign countries. In fact, comparatively little is known about the plant diseases of South America, Africa, or Asia.

Another line of work to which emphasis is being given at present is that of intensive comparative studies of similar diseases of America and of the Old World; for instance, the brown rot disease of stone fruits of this country has its counterpart in Europe in a brown rot disease upon the pome fruits (21). The fungi causing the disease here and in Europe are so similar that they have been considered by many pathologists to be identical, yet their behavior in the two countries is quite different. For instance, our own disease attacks the pome fruits only exceptionally, but it attacks the stone fruits very virulently (23). The European disease, on the other hand, occurs upon stone fruits rather exceptionally, while the disease upon the pome fruits is very destructive. Recently an American investigator (23) secured samples of the disease from the United States and from various localities in Europe and made a careful comparative study of the fungi secured. This resulted in a decision that the two are entirely distinct, an opinion earlier held by the Russian investigator, Woronin, but partially lost sight of in late years.

Similar studies should be made of dozens of others of our common diseases which are present both in this country and in the Old World; and until such studies are made, we can not say with certainty whether our disease is the same as the Old World disease. Just as it is necessary for us to have plant pathologists whose field is not restricted to a single state, so is it necessary that there should

be pathologists whose field is not restricted to any single country; and this fact is recognized by the United States Department of Agriculture. While coöperation is to be expected in actual investigation of plant diseases, in making disease surveys, etc., it is perhaps a little surprising to find that there is already a decided beginning upon coöperation in legislative matters.

There is, in this country, a very strong movement in favor of a uniform horticultural inspection law for all of the states. The various state constitutions vary so much that it is impossible to secure an absolutely uniform inspection law; but very active steps are being taken to make these laws as uniform as possible. There are two instances of a similar kind in other countries which it may be interesting to note here. These are the English colonies of South Africa and of Australia. In both of these cases, a compact federation of the colonies has been established, and what is to all intents and purposes a national inspection law has been placed in operation in each of these federations; that is, plants imported into any colony of the South African Union at the present time are subject to the same rules and regulations as would be the case were they imported into any other colony of the federation.

Besides all this, our plant pathologists are becoming better acquainted personally with those of other countries, and this means better coöperation, for effective coöperation depends absolutely upon personal friendship and sincerity. The policy of the Federal Horticultural Board (25) is to make such regulations as will cause foreign countries to establish and maintain efficient inspection of plants exported to this country. None of the other countries formerly had any such inspection and their first attempts were in many cases no better than they should be. But they are strengthening their inspection service so that even now the nursery stock sent to us is of a decidedly better character than was the case two years ago (24). This also tends to strengthen coöperation between us and other countries, because each has to become more familiar with conditions in the other. In order to illustrate and make clearer the foregoing remarks, the speaker wishes to consider with you a specific disease that is of much interest to New England and which bids fair to become of much economic importance within the next twenty years if it is not completely destroyed soon in this country.

The White Pine Blister Rust (26, 29).

We have with the white pine blister rust a peculiar state of affairs and one which is not often paralleled in the records of plant pathology. The white pine, a native of North America, was carried to Europe about two hundred years ago, and has been widely distributed there. It has, in the main, been very successful as an ornamental, and has even come to be used very extensively in forestry planting in a number of European countries. About fifty years ago it was found that this tree was being attacked by a disease native to the Old World and widely distributed in Europe upon the old world stone pine, *Pinus cembra.* It appears that this disease probably originated in western Siberia and eastern Russia, where is located the original home of this particular pine. We have then the curious condition of an introduced tree attacked by an introduced disease. Whether this is the real state of affairs or not, the disease found very congenial quarters upon its new and relatively succulent American host, the white pine, and attacked it very vigorously; so much so that its cultivation in Denmark has been largely given up on account of this disease, and it threatens to be driven out of cultivation by it in England and in certain districts in other European countries.

In the late 80's there began to develop in this country a considerable demand for young white pine trees for ornamental planting and also to some extent for reforestation of waste lands upon which it was thought this species would thrive. This import trade grew rather steadily until the spring of 1909, at which time very large shipments of this species were made, principally from Germany, into this country. These shipments were estimated to have reached at least as high as three million young seedlings. Practically no attention had been given up to this time to the diseases which might possibly be imported upon such stock, but in the spring of 1909 it was discovered that this serious disease of Europe had been imported into this country in nearly all of the immense importations which were made that spring. Furthermore, it was afterwards found that this disease had also been brought into this country upon young stock in the spring of 1908, but that it had not developed enough to be recognized until the spring of 1909. Worst of all,

this immense number of seedlings had largely been distributed to private parties throughout the Northeastern States and were already set out in the field before the presence of the disease was discovered. The forestry officials of the states known to have received diseased lots of these pines were notified of what had been found, and a meeting was held, at which it was decided that the best thing to be done was to inspect all plantations made from the suspected stock, to destroy all diseased seedlings found, and also to destroy all currants found in the neighborhood of such plantations. The several state officers agreed to carry out this program. This work has been more or less faithfully carried out ever since that time, as it has been found that the inspections of the infected plantations must be made annually for an indefinite number of years.

Damage Done by this Disease.

As above indicated, this disease has been so serious in certain localities in Europe that the white pine has been practically driven out of cultivation in those localities. Ever since the spring of 1909, when the disease was first discovered in this country, the speaker has been investigating it. This experience has shown not a single instance where any tree known to be diseased on the main stem has recovered, that is, a young tree thus diseased is doomed. This fact does not seem to be generally appreciated by those who are unfortunate enough to own trees affected by this disease. The developments of the season of 1913 have convinced the speaker that this disease will run a course quite similar in some respects to that of the chestnut blight, but with this difference, that the progress which is made by the chestnut blight in two or three years will be made by the white pine blister rust only after a period of ten to twenty years. But that progress will be made just as surely as the disease is able to spread. The damage in the long run will be just as complete locally as is that inflicted by the chestnut blight.

The Present Situation (27, 28).

The situation with this disease at the present time in this country is as follows: In no case has the disease secured such a footing that

it cannot be relatively easily eradicated. For a number of years we had a very serious situation in the vicinity of Geneva, New York. In the spring of 1913, however, the state inspectors succeeded in finding two diseased white pine trees approximately fifteen years of age, which had apparently been serving as a center of infection there. These were promptly destroyed, but the disease appeared upon a few neighboring currant bushes. It is believed, however, that this season will reveal none of this disease in that locality, unless there are other diseased white pines about which nothing is known at the present time.

Up to the spring of 1913, this was the most seriously affected of any known area in this country. Apparently we have been able to control the disease here, which should give us encouragement in attacking other outbreaks of the disease. Later in the season of 1913, two serious outbreaks of the disease were found, one in Vermont and one in Massachusetts. It is believed that the center of infection in both cases has been discovered, and it is hoped that the diseased white pines have been completely removed from each of these neighborhoods. Should this prove to be the case, we will have successfully handled three very serious situations. The future, however, alone can show the efficiency of the work which is being done. It is to be expected that the disease will crop up in other places where it is now not known, but it should be noted that in all the serious outbreaks which we have had up to this time, the disease has been present upon relatively old white pines, which were imported some ten or twelve years ago.

The encouraging feature is that white pines imported as long ago as that were almost invariably used for ornamental planting and not for planting in large masses for forestry purposes; that is, they are usually found well isolated from natural bodies of white pine of the neighboring woods, due to the fact that they are commonly used for ornamental effect around the buildings of private estates. This fact alone has saved the situation up to the present time; for in all three of the above mentioned cases, the disease was found in trees which were well separated from neighboring forests comtaining white pines.

It is estimated that about 4,500,000 young white pines were imported into this country since 1900 and that nearly all of these

importations were infected with blister rust. About 1,750,000 out of the 4,500,000 were burned before they were set out by private parties, so that there is still a total of about 2,750,000 trees with the disease scattered among them. Repeated inspection has cost heavily and apparently must be continued an indefinite time. Hence the speaker has urged the total destruction of the remaining imported trees which are known to be infected. Their continued presence in this country is a constant menace to our white pine forests. Moreover, the cost of inspection has already much exceeded their total valuation when they were imported. Disregarding their increased valuation, due to growth made since 1909, a liberal estimate of the cost of these trees and of planting them out would not exceed $225,000. This is a large amount of property to destroy but it must be remembered that for the sake of this really small sum we are risking white pine forest property estimated to be worth $600,000,000 in 1909 (30). It would seem that such values as these should not be placed in the slightest danger from an imported disease like the white pine blister rust.

Comparison of White Pine Blister Rust with Chestnut Blight with Reference to Possible Methods of Control.

In order to make clearer the possible methods of combating the white pine blister rust, I wish to compare it with you with the chestnut blight, a disease with which you are more or less familiar, and which has been much discussed both in the scientific and popular press for several years. The chestnut blight fungus is entirely different from the white pine blister rust fungus. They are widely separated in their characters and in their method of producing spores and distributing them. The chestnut blight fungus may infect a chestnut tree at any time of year that the weather is warm enough for the germination of spores, that is, when ordinary garden seeds would sprout. The chestnut blight produces millions of spores of two distinct forms. The one which is produced in the spring and early summer is known as the summer spore stage. These spores ooze out in sticky masses from the mouths of the fruiting bodies, and in extreme cases may occur as distinct tendrils.

These are apparently distributed by rain washing them from one part of the tree to another (31), or by other mechanical means, such as sticking to the feet, fur, and feathers of squirrels and birds passing over them (32, 33); that is, they are not distributed by the wind to any extent. They serve to spread the disease from an original center of infection to adjacent trees and parts of the same tree. The second stage, known as the winter spore form, however, is produced in tiny sacks contained within the spore cases, and when set free from the spore cases, they are forcibly ejected into the air some little distance. They are very readily carried by the wind when they are thrown out into the air, and this is apparently their chief method of distribution (34).

The chestnut blight fungus does not require any alternate host, other than the chestnut, in order to complete its life history. Stated in another way, any of the spores produced by the chestnut blight fungus can, under favorable circumstances, produce the disease again upon chestnut trees. Another point which should not be overlooked in connection with this disease is that it occurs absolutely indifferently upon ornamental, orchard, and forest trees, provided such trees are within its range of distribution. The only feasible method of controlling this disease seems to be that of cutting out all of the diseased trees along the advance line of its progress; but this is an exceedingly difficult thing to do, for the following reasons: A very careful inspection may be made in the spring and all of the diseased trees thus found may be cut and peeled, and the brush and bark burned on the stumps, with the very greatest care. That same summer, or early next spring, reinspection may show additional trees which have developed the disease since the first cutting out was done. This is not the fault of the inspector, but is due to the fact that the fungus may be, and very often is, present in the bark of apparently healthy trees in early stages of infection, so that it is not externally visible.

The matter of cutting out chestnut blight then in a given area, supposing all infection from without this area could be prevented, is about as follows: Inspection for the disease, followed by cutting of all the infected trees found, peeling the stumps and burning the brush over them. The next season reinspection with accompanying cutting of infected trees thus found. The third season a reinspection with the cutting of the infected trees found. The first

year there may be found a considerable number of affected trees. If the work is carefully and thoroughly done, the second inspection should reveal but a few scattered cases, and the third inspection should reveal none or a very few. But this presupposes that there will be no infection from without the inspected area. Infection from outside adds to these difficulties. It must not be concluded from these statements that cutting out the chestnut blight does no good. It does do good, and at least hinders the progress of the disease while utilizing the diseased trees before they spoil from decay or insect depredations.

With the white pine blister rust, however, the situation is very different. We have, first of all, a fungous parasite which requires two distinct sets of host, i. e., pines and currants, in order to complete its life history. We find at once that there are certain forms of spores which will infect each set of hosts but not the other; that is, the spores produced upon the pine will not infect the pine, but they do infect currants. There are two forms of spores produced upon the currants; the first will infect currant leaves and is the form in which the disease spreads very readily and extensively upon currants. The second kind of spores formed on currants will not infect currants, but will infect pines. The spores are produced upon the pines only rather early in the spring, mostly in the month of May. The spores upon the currants are produced from the middle of June until the currant leaves are shed in the fall. Thus you will at once perceive we have a great advantage in dealing with the blister rust, in that a separation of the two kinds of hosts prevents the fungus from reinfecting the next season whichever host is present within the diseased area.

Let us assume a specific instance where the disease is known to be present in young imported white pines which are planted as ornamentals around the buildings of a large private estate. Upon this estate let us assume there are garden currants present quite close to the affected pines, and that the disease is already present upon the currants. What steps can be taken to reduce the danger of the spread of the disease to native white pines of the woodlot a half mile away? One immediately thinks, "Why, pull up the currants and burn them. As long as they are absent from this vicinity there is no danger." This, however, will be found to be only a partial solution of our problem. Were this done, the

diseased white pines will continue to bear fruiting bodies of the fungus every spring as long as they live. It is unknown at present to how great a distance these spores may be carried, and the presence of diseased pines is much more dangerous than the presence of diseased currants, because it has been found that the disease lives for only a single year upon the currant leaves, and that the currants must be reinfected from pines each spring in order to have the disease in succeeding years.

The white pine blister rust is not yet permanently established in this country, and unlike the chestnut blight, it has not attacked our forests. We know where nearly all white pines which are affected with this disease are located. I say *nearly*, because there are undoubtedly scattering private importations which are not yet known to us. To return to our estate with the disease present upon both pines and currants. The only safe thing to do in a case of this kind is to promptly destroy all affected pines, which are usually few in number. This prevents any possible outbreaks in future years. Where the disease is also upon currants, if it is found early in the season, the currants should be destroyed, or else have all the leaves carefully pulled from them. If found late in the fall upon the currants, the danger for that year perhaps would not be increased by allowing the currants to remain. The great danger from the disease upon currants is the possible infection of neighboring white pines of the forests with the disease. This is something which has never yet occurred in this country. Where the disease is found late in the season upon the currant leaves, very close and careful inspection must be made for at least five succeeding years of all the neighboring five-leaved pines for possible new infections upon them from the currants. Such new infections have been found in two localities in this country already upon ornamental trees.

It must be remembered that our object is the total destruction of the disease wherever it is found, with the idea of its ultimate eradication from the country. Any other ideal in carrying on this work will result in the final permanent establishment of this dangerous disease in our forests. The presence of the disease upon the main trunk of a young white pine tree means the final death of the affected tree, as not a single case of this kind has yet been seen

where the diseased tree recovered. If the disease is present upon branches of the tree and not upon the main stem, it may be argued, "Why not cut off the affected branch?" This, as you well know, would result in a ragged, irregularly shaped tree which, from the ornamental standpoint, would be unsatisfactory. From the pathologist's viewpoint, this procedure is very poor, because the disease, if present upon a single branch, is almost sure to have infected other branches of the same tree or neighboring trees. Some of these infections will be quite sure to be in early stages so as not to be visible externally; hence they cannot be found. The disease occurs in this way upon trees not less than fifteen to twenty feet in height. If you will step out into your own grounds and attempt to look at every twig and branch upon one such tree, and be sure there is no cankered area present upon those twigs and branches, you will at once acknowledge that such inspection must be exceedingly careful in order to detect all visible cases of the disease, not to mention those which have not yet become visible. "To err is human," and it is almost superhuman for a person to make such an inspection and be at all sure none of the disease is left in the tree. This is why the above statement was made that when the disease is found upon white pines, the entire tree should be removed and destroyed. If the tree is so located that it is considered an irremediable loss for it to be removed, it is practicable to secure from the neighboring forest or from nurserymen a tree of about the same size and set it in its place. If the disease is found present only upon pines, this procedure is absolutely safe. If the disease was found upon both pines and currants, and the diseased pines, together with the diseased currants, are removed and burned, this procedure also should be safe. It will be argued that it will cost a large amount of money to secure trees of such size; but under such circumstances the owner had far better undergo this expense than to run the risk of being responsible for the permanent establishment of this disease here in this country, as Mr. Trouvelot is said to be unintentionally for that of the gypsy moth.

It is useless for an individual who is not a trained pathologist to attempt to handle this disease when it is found upon his grounds, without expert advice; and by expert advice I mean, not the advice of some tree surgery company, but the advice of the state nursery

inspector, or of the pathologist of the state experiment station, or of an expert from the Office of Forest Pathology in the Department of Agriculture at Washington. The best course to pursue, if you believe this disease is present upon your grounds, is to notify your state horticultural inspector or the Department of Agriculture in Washington, and ask that an examination be made to make sure of the true state of affairs. Such application will result in an expert examination being made, if the facts justify such a course, and the most expert advice and attention will be given in controlling the disease and in tracing out the whole extent of the outbreak. It is not customary for any charge to be made for this service. The inspectors, either of the state or the United States Department of Agriculture, feel deeply their responsibility for private property, and will do everything possible to avoid its destruction; but it oftentimes becomes necessary to destroy a certain amount of such property in order to prevent much greater ultimate loss, either to the same parties or their neighbors.

Results of the Work Already Done.

The work already done upon this disease has had the following practical results: The attention of all responsible officials has been called to the presence of this disease and the great danger from allowing it to become established and to spread unhindered. One serious outbreak has apparently been almost completely overcome, and in no case is the disease yet known to have become so firmly established that we cannot eradicate it. This disease, together with the black wart of the potato, has convinced the public that there is real need for protection from dangerous foreign plant diseases. As a result of this public attitude, the National Quarantine Act was passed in 1912, and a strict quarantine has been enforced against all five-leaved pines from the old world. Hence we are no longer receiving this disease from other countries. If the diseased trees that we already have can be finally destroyed before the disease gets a foothold in our forests we may well congratulate ourselves, for this disease is, in the speaker's opinion, the most dangerous one for our white pine that is now known.

Federal vs. State Power.

Finally, allow me to say a word regarding Federal and state power to deal with this, as well as other dangerous diseases. Under our present system of government Federal officers have power to inspect, condemn or pass nursery stock only when it is an article of interstate commerce or is being imported from another country. State officers, on the other hand, have complete power to enter private grounds, to inspect, and to condemn nursery stock or other plants while they are in the hands of their owner. Your inspection officer in Massachusetts I believe to be honest, capable, and conscientious. If you wish to prevent the white pine blister rust from becoming permanently established here in your state, make it known, back your officer with sufficient money so that he can do good work, and if you are unfortunate enough to have some of the disease in your own grounds, get his advice and follow it. A little public backing at this time will mean the difference between success and failure, and will give an example that cannot fail to be heeded by other states.

BIBLIOGRAPHY.

(1) Pierce, N. B. The California vine disease. U. S. Dept. Agr., Division Veg. Phys. & Path. Bull. **2**: 1–222. 1892.

(2) ——— Grape diseases on the Pacific coast. U. S. Dept. Agr., Farmers' Bull. **30**: 7–8. 1895.

(3) Viala, Pierre. Les maladies de la vigne. pp. 1–56. 1893.

(4) Schrenk, H. von, and Spaulding, Perley. The bitter rot of the apple. U. S. Dept. Agr., Bur. Pl. Ind. Bull. **44**: 10. 1903.

(5) Woods, A. F. The wastes of the farm. U. S. Dept. Agr., Yearbook for 1908. pp. 207–212. 1909.

(6) Cook, Mel. T. The Diseases of Tropical Plants. pp. 160–162. 1913.

(7) Massee, Geo. Diseases of Cultivated Plants and Trees. p. 52. 1910.

(8) Faber, C. von. Die Krankheiten und Schädlinge des Kaffees I. Centbl. f. Bakt., 2 Abt., **21**: 99–112. 1908.

(9) Stevens, F. L., and Hall, J. G. Diseases of Economic Plants. p. 14. 1910.

(10) Freeman, E. M., and Johnson, E. C. The rusts of grains in the United States. U. S. Dept. Agr., Bur. Pl. Ind. Bull. **216**: 7–8. 1911.

(11) Bolley, H. L., and Pritchard, F. J. Rust problems; facts, observations and theories; possible means of control. No. Dak. Agr. Exp. Sta. Bull. **68**: 615. 1906.

(12) Stewart, F. C., Eustace, H. J., and Sirrine, F. A. Potato spraying experiments in 1903. N. Y., Geneva, Agr. Exp. Sta. Bull. **241**: 252. 1903.

(13) Wilson, James. Report of the Secretary. U. S. Dept. Agr., Yearbook for 1912. p. 20. 1913.

(14) Metcalf, Haven, and Collins, J. F. The control of the chestnut bark disease. U. S. Dept. Agr., Farmers' Bull. **467**: 5. 1911.

(15) Orton, W. A. The biological basis of international phytopathology. Phytopathology, **4**: 11–19. 1914.

(16) Jones, L. R., Giddings, N. J., and Lutman, B. F. Investigations of the potato fungus Phytophthora infestans. U. S. Dept. Agr., Bur. Pl. Ind. Bull. **245**: 1–110. 1912. Also published simultaneously as Vt. Agr. Exp. Sta. Bull. 168.

(17) Herter, W. Die Ausbreitung der Stachelbeerpest, Sphaerotheca morsuvae (Schweinitz) Berkeley in Europa in Jahre 1906. Centbl. f. Bakt., 2 Abt., **17**: 764–773. 1907.

(18) McAlpine, D. The rusts of Australia. pp. 43–44, 178–179. 1906.

(19) Smith, R. E. Asparagus and asparagus rust in California. Calif. Agr. Exp. Sta. Bull. **165**: 18–21. 1905.

(20) Galloway, B. T. The Bureau of Plant Industry, its functions and efficiency. U. S. Dept. Agr., Bur. Pl. Ind. Circular **117**: 1–12. 1913.

(21) Shear, C. L. Some observations on phytopathological problems in Europe and America. Phytopathology, **3**: 77–87. 1913.

(22) Orton, W. A. The plant disease survey of the United States. Science, n. s., **25**: 268. 1907.

(23) Matheny, W. A. A comparison of the American brown-rot fungus with Sclerotinia fructigena and S. cinerea of Europe. Botanical Gazette. **56**: 418–432. 1913.

(24) Orton, W. A. International phytopathology and quarantine legislation. Phytopathology, **3**: 143–151. 1913.

(25) Marlatt, C. L. Report of the Federal Horticultural Board. pp. 1–11. 1913.

(26) Spaulding, Perley. The blister rust of white pine. U. S. Dept. Agr., Bur. Pl. Ind. Bull. **206**: 1–88. 1911. (With colored plate of both stages).

(27) ———. The present status of the white pine blister rust. U. S. Dept. Agr., Bur. Pl. Ind. Circular **129**: 9–20. 1913.

(28) ———. New facts concerning the white pine blister rust. U. S. Dept. Agr., Bull. **116**: 1–8. 1914.

(29) ———, and Field, Ethel C. Two dangerous imported plant diseases. U. S. Dept. Agr., Farmers' Bull. **489**: 1–19. 1912.

(30) Kellogg, R. S. The timber supply of the United States. U. S. Dept. Agr., Forest Service, Circular **166**: 8, 19. 1909.

(31) Metcalf, Haven. The chestnut bark disease. U. S. Dept. Agr., Yearbook for 1912, pp. 363–372. 1913.

(32) Heald, F. D. The symptoms of chestnut tree blight and a brief description of the blight fungus. Pa. Chestnut Tree Blight Commission, Bull. **5**: 1–15. 1913.

(33) ———, and Studhalter, R. A. Preliminary note on birds as carriers of the chestnut blight fungus. Science, n. s., **38**: 278–280. 1913.

(34) ———, Gardner, M. W., and Studhalter, R. A. Wind dissemination of ascospores of the chestnut blight fungus. Phytopathology, **4**: 51. 1914.

(35) Metcalf, Haven. The immunity of the Japanese chestnut to the bark disease. U. S. Dept. Agr., Bur. Pl. Ind. Bull. **121**: 3–4. 1908.

(36) Marlatt, C. L. Pests and parasites. National Geographic Magazine, **17**: 345. 1911.

(37) Fairchild, David. The discovery of the chestnut bark disease in China. Science, n. s., **38**: 297–299. 1913.

(38) Shear, C. L., and Stevens, N. E. The chestnut blight parasite (Endothia parasitica) from China. Science, n. s., **38**: 295–297. 1913.

(39) Metcalf, Haven. The chestnut bark disease. The Journal of Heredity, **5**: 8–18. 1914.

(40) Collins, J. F. The chestnut bark disease on chestnut fruits. Science, n. s., **38**: 857–858. 1913.

634.079
M4
H5t
APR 14 1915

TRANSACTIONS

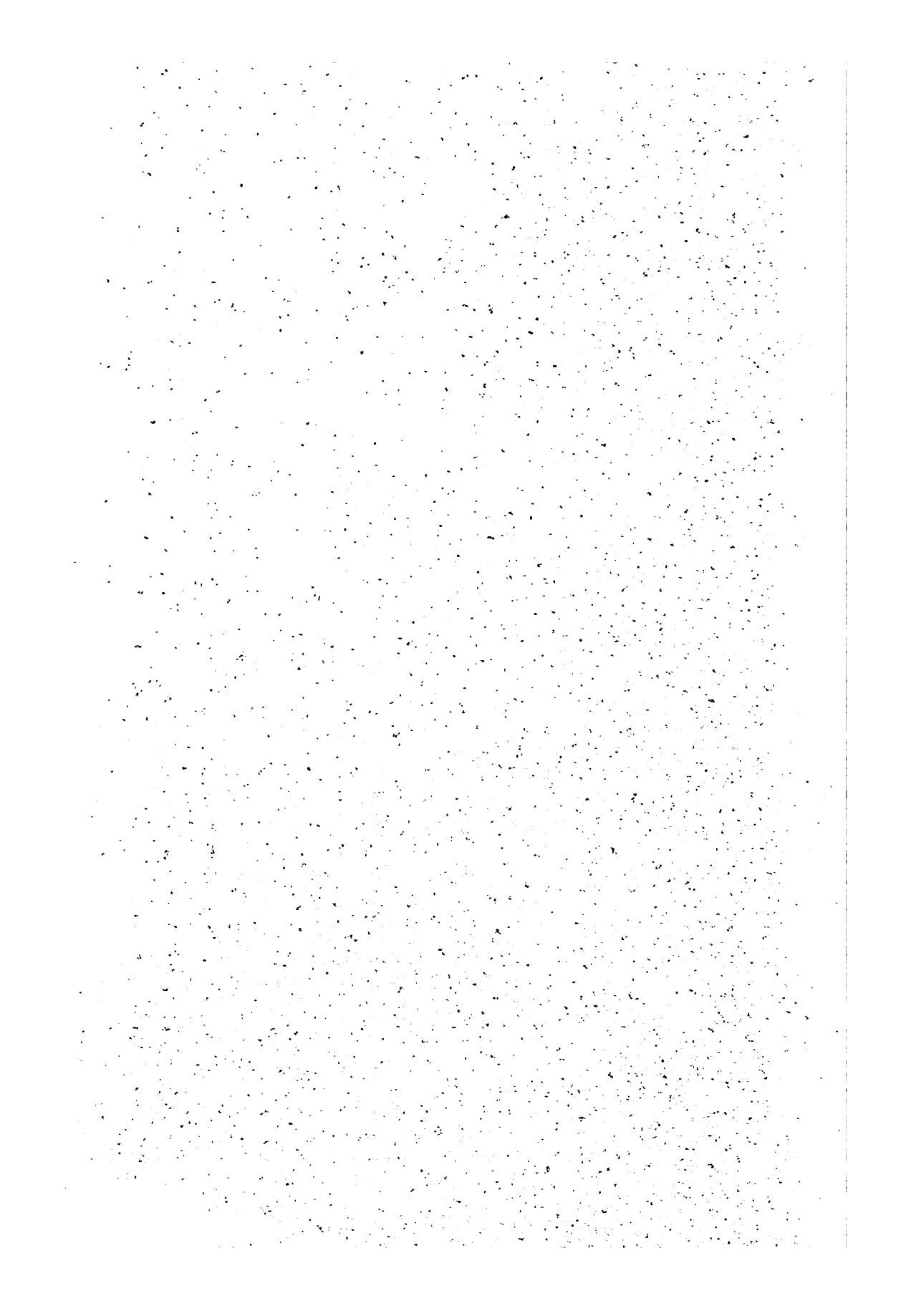
OF THE

MASSACHUSETTS HORTICULTURAL SOCIETY

FOR THE YEAR 1914

PART II

PUBLISHED BY THE SOCIETY
BOSTON
NINETEEN HUNDRED AND FIFTEEN



TRANSACTIONS

OF THE

Massachusetts Horticultural Society

FOR THE YEAR 1914

PART II

BOSTON
PRINTED FOR THE SOCIETY
NINETEEN HUNDRED AND FIFTEEN

MASSACHUSETTS HORTICULTURAL SOCIETY

1914

The Transactions of the Society are issued annually in two parts under the direction of the Committee on Lectures and Publications.

Communications relating to the objects of the Society, its publications, exhibitions, and membership, may be addressed to William P. Rich, Secretary, Horticultural Hall, No. 300 Massachusetts Avenue, Boston, Massachusetts.

WILFRID WHEELER, *Chairman*	*Committee on Lectures and Publications*
GEORGE B. DORR	
PROF. F. C. SEARS	

CONTENTS

ANNUAL REPORTS FOR THE YEAR 1914

Report of the Board of Trustees 187

Report of the Committee on Prizes and Exhibitions . 191

Report of the Committee on Plants and Flowers . . 193

Report of the Committee on Fruits 229

Report of the Committee on Vegetables . . . 247

Report of the Committee on Gardens 261

Report of the Committee on Children's Gardens . . 269

Report of the Committee on Lectures and Publications 275

Report of the Delegate to the State Board of Agriculture 277

Report of the Secretary and Librarian 281

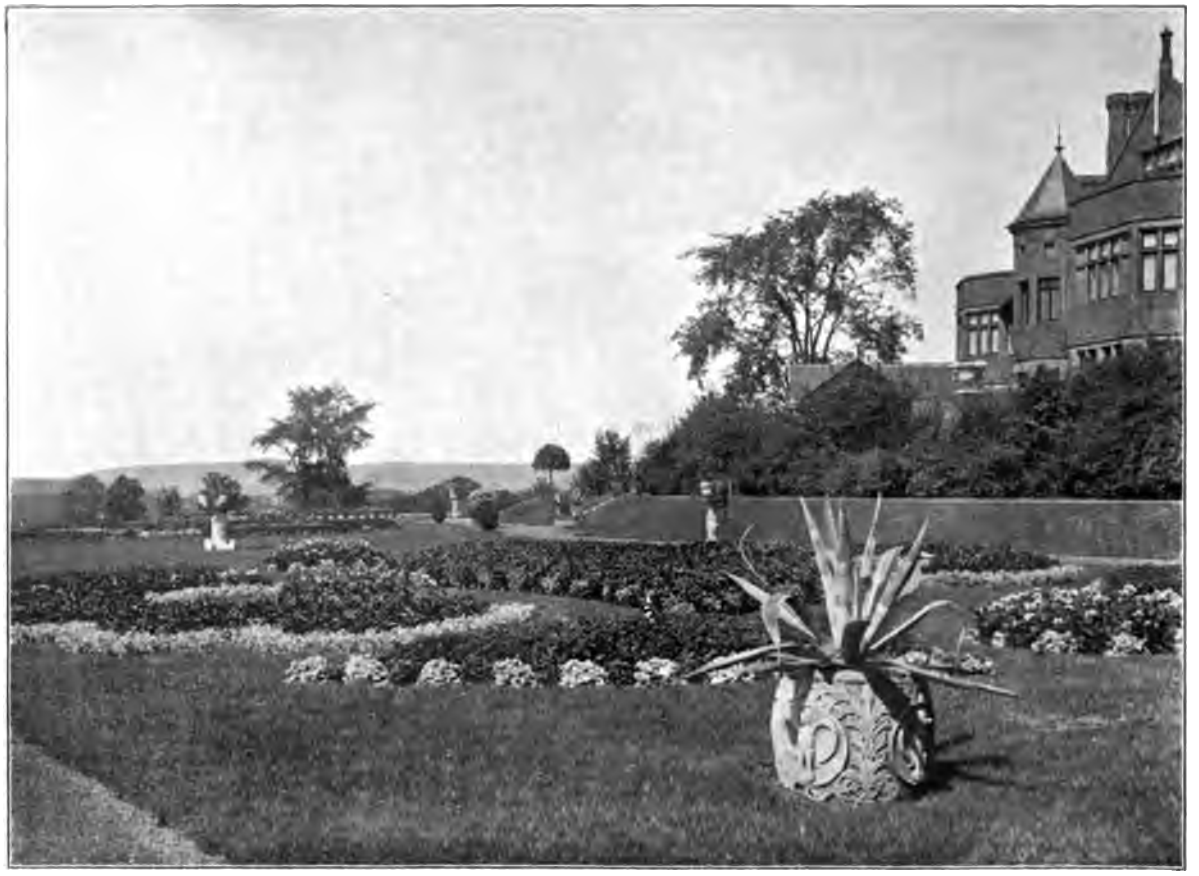
Report of the Treasurer 285

THE ANNUAL MEETING, NOVEMBER 14, 1914 . . . 293

NECROLOGY, 1914 297

OFFICERS, COMMITTEES, AND MEMBERS, 1914 . . . 303

ANNUAL REPORTS FOR THE YEAR 1914.



VIEW ON THE ESTATE OF R. W. PATERSON, LENOX, MASS.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

1914, PART II.

REPORT OF THE BOARD OF TRUSTEES FOR THE YEAR 1914.

The Board of Trustees of the Massachusetts Horticultural Society presents herewith to the members a summary of the business transacted at its meetings during the year 1914.

April 4. A communication was presented from Mr. C. C. Laney of Rochester, New York, acknowledging the receipt of the George Robert White Medal of Honor, recently awarded the Rochester Park Commission.

A communication from the Committee on Prizes and Exhibitions was also presented recommending the appropriation of $6000.00, in addition to the income of the special prize funds of the Society, for prizes and gratuities for the year 1915. On motion of Mr. Wilder the recommendation of the committee was approved and adopted.

On motion of Mr. Roland it was voted that a committee of three be appointed to consider the matter of coöperation with the commercial growers and florists, with a view to making the Spring Exhibition of 1915 one of unusual size and interest. The President appointed as this committee Messrs. James Wheeler, Chairman, William Sim, and Herman Bartsch.

On motion of Mr. Saltonstall it was voted that $25.00 of every life membership fee received be added to the permanent funds of the Society, the income only to be used for general purposes, and that the remaining $5.00 be held for such action as the Board may take later in the year.

Mr. Allen again called attention to the unsatisfactory color of the walls of the large exhibition hall and suggested that something should be done to change them to a tint more in harmony with the floral displays. After some discussion of the subject it was voted, on motion of Mr. Saltonstall, that a special committee, consisting of the President and Messrs. Allen and Kidder, be appointed to consider the suggestions of Mr. Allen and to have full power to carry them into effect if it could be done without expense to the Society or from the Society's funds.

Mr. Wheeler suggested that an attractive poster be adopted for further advertising the exhibitions and lectures of the Society, and on his motion it was voted to appoint a committee of three to consider the subject and report at the October meeting. The President appointed as this committee Messrs. Allen, Wheeler, and the Secretary.

Mr. Roland referred to the Thirtieth Convention of the Society of American Florists and Ornamental Horticulturists which is to be held in Boston in August next. He said that he would like to see the Massachusetts Horticultural Society identified in some way with this event which promised to be one of national interest.

President Farquhar stated that the Society of American Florists was not merely a trade organization but went far beyond that in promoting the interests of horticulture throughout the country. He said that the Massachusetts Horticultural Society had been asked to appoint delegates to represent it on the committees to be selected from the various horticultural organizations of the city.

On motion of Mr. Saltonstall it was voted that the President be authorized to appoint such delegates to the convention without expense to the Society. The President appointed the following named members of the Society as delegates to represent the Society at the Thirtieth Convention of the Society of American Florists: Messrs. R. M. Saltonstall, E. B. Wilder, W. P. Rich, William

Downs, James Wheeler, D. R. Craig, Peter Fisher, Jackson T. Dawson, and Geo. B. Dorr.

It was voted also that the President be authorized to appoint a special committee of three Trustees, of which the President should be a member, to formulate methods for the proper representation of the Society at the convention and an appropriation not exceeding $500.00 was voted for this purpose. The President appointed as this committee Messrs. Farquhar, Roland, and Wilder.

October 3. A communication from the American Peony Society was read in reference to the annual meeting of that Society in Boston, 1915. It was voted to extend an invitation to the American Peony Society to hold its next meeting in Boston in connection with the Peony Exhibition of the Massachusetts Horticultural Society, June 12 and 13, 1915.

The special committee, consisting of Messrs. Saltonstall, Roland, and Wilder, appointed by the President to present at this meeting a list of nominations for the Standing Committees of the Society for the ensuing year submitted a report which after some changes was accepted as follows:

Standing Committees of the Society for the Year 1915.

Finance:— Walter Hunnewell, Chairman, Arthur F. Estabrook, Stephen M. Weld.

Prizes and Exhibitions:— James Wheeler, Chairman, Duncan Finlayson, Peter Fisher, S. J. Goddard, T. D. Hatfield, Dr. W. G. Kendall, Edwin Jenkins, Edward B. Wilder.

Plants and Flowers:— T. D. Hatfield, Chairman, Arthur H. Fewkes, Donald McKenzie, James Marlborough, William Nicholson, William Sim.

Fruits:— Edward B. Wilder, Chairman, William Downs, Harold L. Frost, Ralph W. Rees.

Vegetables:— Duncan Finlayson, Chairman, Wm. N. Craig, Richard Hittinger, Henry M. Howard, John L. Smith.

Gardens and Greenhouses:— John K. M. L. Farquhar, Chairman, Robert Cameron, David R. Craig, Jackson T. Dawson, William Downs, Arthur H. Fewkes, T. D. Hatfield.

Library:— Charles S. Sargent, Chairman, Ernest B. Dane, Nath'n'l. T. Kidder, Wm. P. Rich.

Lectures and Publications:— Wilfrid Wheeler, Chairman, George B. Dorr, F. C. Sears, Fred A. Wilson.

Children's Gardens:— Henry S. Adams, Chairman, Philip P. Chase, Mrs. Augustus Hemenway, Dr. Harris Kennedy, Mrs. W. Rodman Peabody, Harry S. Rand, Miss Margaret A. Rand, Wm. P. Rich, James Wheeler.

The Committee on Prizes and Exhibitions presented the Schedule of Prizes and Exhibitions for the year 1915 which was duly approved and accepted.

The special committee, consisting of Messrs. Sargent, Farquhar, and Roland, on the award of the George Robert White Medal of Honor for the current year reported the name of Sir Harry James Veitch of London. In presenting this name, Prof. Sargent stated that this award of the White Medal was in appreciation of the great work accomplished by Mr. Veitch in promoting the interest in horticulture in both Great Britain and the United States.

On motion of Prof. Sargent it was voted to award the George Robert White Medal for 1914 to Sir Harry James Veitch.

WILLIAM P. RICH.
Secretary.

REPORT OF THE COMMITTEE ON PRIZES AND EXHIBITIONS FOR THE YEAR 1914.

By James Wheeler, Chairman.

During the year 1914 there were held twelve regular exhibitions and one special with an admission charge of fifty cents at the Spring and Chrysanthemum Shows. At the Spring Show competition and quality were satisfactory but the receipts for paid admissions are steadily decreasing. Your committee has held two special meetings to discuss the lack of interest in the Shows and we find by reports from other exhibitions throughout the country that they have had the same experience where an admission fee was charged.

The free exhibitions have been better than those of the previous year with good displays and large attendance.

During the Convention of the Society of American Florists and Ornamental Horticulturists held in Boston in August, your committee felt that the Society should be represented by an exhibition. In coöperation with the President invitations were sent out to those usually exhibiting who were told that no prizes were to be offered. Nearly everyone asked responded liberally with the result that all three halls of the building were well filled and the exhibit of gladioli in the Lecture Hall was never surpassed.

The Chrysanthemum Show as a whole was not up to the standard. There were more large cut blooms and of better quality than we have had for many years but there were few chrysanthemum plants and those shown were not up to the standard of previous years.

Soon after the Chrysanthemum Show a special meeting of the committee was held in connection with a special committee of the Board of Trustees, including the President, to discuss methods for the improvement of the exhibitions of the ensuing year.

At this meeting it was decided to change the name of the Chrysanthemum Show to The Grand Autumn Exhibition of Plants, Flowers, Fruits, and Vegetables, to increase the amounts of the

prizes offered, and to add other special features. Each member present was appointed a special committee to interest cultivators and lovers of horticulture in the Society's exhibitions so that it may be able to maintain its position as a leader in the horticultural advancement of the country.

JAMES WHEELER
DUNCAN FINLAYSON
PETER FISHER
S. J. GODDARD
T. D. HATFIELD
DR. W. G. KENDALL
ALEXANDER MONTGOMERY
EDWARD B. WILDER

Committee on Prizes and Exhibitions.

CARLOS DE HEREDIA ESTATE, LENOX, MASS.

REPORT OF THE COMMITTEE ON PLANTS AND FLOWERS FOR THE YEAR 1914.

By T. D. Hatfield, Chairman.

The shows of the year 1914 were above the average in quality of material used and the arrangement was of a high order of merit.

On January 3d Bayard Thayer of South Lancaster exhibited a very fine specimen of *Buddleia asiatica*, for which a First Class Certificate of Merit was awarded Mr. Thayer and a Silver Medal to William Anderson, the gardener, for superior cultivation. This was a plant of graceful contour, about four feet high, with long drooping spikes of white, sweet-scented flowers. It promises to be valuable for indoor winter decoration, as small plants in four inch pots bloom as freely as larger ones.

On January 10th a Bronze Medal was awarded the Weld Garden for a very fine specimen of *Cymbidium Wiganianum*, and a Silver Medal was given Mrs. J. L. Gardner for an elegant group of *Euphorbia Jacquiniaeflora*.

Midwinter Exhibition.

The Midwinter Show, January 31, was noted for extra fine specimens of Begonia Gloire de Lorraine and Primulas. The Primulas shown by William Whitman included very fine specimens of *P. malacoides* and *P. obconica* for which his gardener, Martin Sullivan, was awarded Cultural Certificates.

The Gloire de Lorraine Begonias from Mrs. J. L. Gardner, A. M. Davenport, and Mrs. Lester Leland were all good. Wheeler & Co. and Mrs. J. L. Gardner had splendid displays of orchids.

The carnation growers did themselves much credit, A. A. Pembroke and M. A. Patten making fine displays, and the competition was close. J. W. Minot of Portland, Maine, was a new exhibitor

of carnations. He showed Winsor, pink; Pocahontas, crimson; and Beacon, scarlet; taking first prize in each class.

Thomas Roland was awarded a First Class Certificate for a display of winter-flowering Spencer sweet peas. This is the first time winter-flowering Spencers have been shown. The varieties were Christmas Pink, Spencer, and White Spencer.

F. J. Dolansky showed a form of *Cattleya Trianae*, blush-white sepals and petals and yellow throat, named Mrs. Thomas F. Galvin. It was awarded a First Class Certificate. Duncan Finlayson was given a First Class Certificate for a fine specimen hybrid orchid, *Cymbidium eburneum* × *insigne*, tinted white with finely spotted lip. It was distinct and superior to the type.

H. Huebner of Groton made a splendid display of winter-flowering snapdragons. He has been selecting them for years and has developed the winter-flowering tendency to a considerable degree. At first he had pink and now has them in three or four other colors.

A First Class Certificate was awarded M. A. Patten & Co. for a superior form of white winter-flowering mignonette named Farquhar's Universal. Knight and Struck Co. of New York made a pretty display of *Epacris paludosa* and *Chorizema cordata*.

Spring Exhibition.

The Spring Show, March 12, was a good show all through. The competitive features were extra good cyclamen, forced bulbs, cinerarias, orchids, schizanthus, and cut roses.

Competition between Duncan Finlayson and Mrs. Lester Leland was very close, with honors about even in the matter of awards. Mrs. J. L. Gardner and William Whitman split about even in cinerarias. Bulbous plants by A. W. Preston and William Whitman were remarkably good and quite up to the standard. Henry L. and Margaret A. Rand kept up the amateurs' end and Duncan Finlayson was first in the orchid group with a very fine lot.

Among the miscellaneous groups Thomas Roland's exhibit of hardwooded plants was a striking feature. His specimens of *Erica melanthera* were perfect in every way, graceful plants, about nine feet high; standing separately they made a wonderful effect. It is questionable if such magnificent specimens have been seen any-

where before. The Society's Gold Medal was awarded Mr. Roland.

Mr. Roland's group was mainly acacias. It was wonderful in the variety and beauty of individual specimens and marvelously well flowered. Noteworthy were specimens of *Acacia Baileyana* and *A. pubescens*. A Special Diploma was awarded Mr. Roland for this unique display.

R. & J. Farquhar's collection of seasonable plants made an interesting and showy group and detail in arrangement was well carried out. The group included forced lilacs and rhododendrons. Conspicuous among the latter were specimens of Pink Pearl and Camille de Rohan. Among other plants were standard Wistarias, Deutzias, Cytisus, Spiraeas, *Azalea, mollis, A. Thunbergii*, Forsythias, and *Magnolia soulangeana*. The whole was set off with palms, bay trees, ferns, and edged with *Euonymus radicans*. In another place the Messrs. Farquhar made a pretty display of the yellow calla (*Richardia Elliottiana*).

The Weld Garden decorative group had marguerites, primulas, rhododendrons, azaleas, acacias, coronillas, schizanthus, lilacs, and bulbous plants.

In Edgar Brothers' rose group were plants of Tausendschon, Clothilde Soupert, Lady Gay, Crimson Rambler, American Beauty, Marechale Niel, and Hiawatha. It was prettily arranged.

Mrs. J. L. Gardner's group of bulbous plants arranged for effect was nicely done. The different kinds of bulbs were well represented and set off with asparagus ferns and Grevillia.

Walter Hunnewell had a nice lot of *Erica melanthera* and Miss Cornelia Warren some excellent forced roses. Miss Warren's group of acacias, cytisus, and heaths set off with forced forgetmenot and white *Primula obconica* made a pretty color contrast.

Edgar Brothers' commercial group contained azaleas, palms, cytisus, spiraeas, rhododendrons, acacias, and bulbous plants in bloom.

Thomas E. Proctor (James Marlborough, gardener) put up a bright group of flowering plants. All were good specimens including *Primula malacoides*, wallflowers, cytisus, stocks, acacias, azaleas, and some remarkably fine specimens of rhododendron Pink Pearl.

The Weld Garden orchid group which won first prize was rich in

Cymbidiums, including *C. insigne, C. Lowianum, C. Schroderianum,* also *Cypripedium insigne, Cattleya Schroderae, Dendrobium virginale,* and *D. Wardianum.*

Edward MacMulkin's group was mostly Cattleyas, but nicely displayed, and F. J. Dolansky exhibited Cattleyas for the most part. Miss Warren showed an unusually fine specimen of *Azalea indica.* Mrs. Lester Leland had some neatly trained cytisus, boronia, and heaths which attracted a good deal of attention.

The Waban Rose Conservatories sent some magnificent cut roses. Among them were Killarney Queen and Mrs. Charles Russell. A new variety, Mrs. Moorfield Storey, on the style of Madame de Watteville, but more double, on better stems, and deliciously perfumed, was awarded a Silver Medal.

The Montgomery Co. of Hadley sent a new Hybrid Tea rose named the Hadley, a velvety crimson. We do not remember seeing its equal in this color nor one that stood so long.

First Class Certificates went to William Sim for sweet peas, Orange Orchid and Bohemian Girl, pink. Walter Angus of Waltham sent a pretty lot of cut blooms of the Cherokee rose (*Rosa laevigata*) and camellias.

The Cottage Gardens, New York, were awarded a Silver Medal for carnation Matchless, a fine new white variety, grown and exhibited by William Sim. The carnation growers made excellent displays. S. J. Goddard and A. A. Pembroke were the principal exhibitors. The varieties mostly shown were Benora, variegated; Rosette, pink; Beacon, red; Pink Delight; and Yellow Star.

May Exhibition.

Calceolarias were quite up to the standard; the new Stewartii shown by E. A. Clark was extra good. A pair of *Cytisus Laburnum* showed by Mr. Clark was an attraction and showed how valuable this plant is for decorative effect at this season.

Harry S. Rand made a remarkable exhibit of scented-leaved geraniums. There were over one hundred varieties of these old-fashioned plants and they attracted a good deal of attention. He was awarded a First Class Certificate.

F. W. Fletcher of Auburndale made a large display of his new pink snapdragon Nelrose, an attractive winter-flowering variety, and was awarded a Silver Medal.

Among Mrs. J. L. Gardner's display of orchids were some extra fine plants of *Cattleya Skinneri, Calanthe veratrifolia,* a pretty and rather uncommon white-flowering variety, *Cattleya Mossiae, Phalaenopsis amabilis,* and some Miltonias. The group was neatly edged with Panicum and Selaginella.

June Exhibitions.

The extremely hot weather carried most rhododendron blooms beyond the date set for the Rhododendron Show, with the result that only late varieties were exhibited. Walter Hunnewell put up a table of over one hundred vases of *R. delicatissimum.* The T. C. Thurlow's Sons Co. of West Newbury was the only other exhibitor, the season being just right for them.

Orchids were put up in good shape by William Thatcher, gardener for Mrs. J. L. Gardner. The group contained *Cattleya Mossiae, Phalaenopsis amabilis, P. Schilleriana, Vanda teres, Calanthe veratrifolia,* and *Laelia cinnamomea,* set off nicely with palms and other decorative plants.

Extensive groups of hardy, herbaceous flowers were tastefully arranged by R. & J. Farquhar & Co., who were awarded a Silver Medal; by the Mount Desert Nurseries, including bold vases of *Eremurus himalaiacus,* German iris, *Polygonatum multiflorum,* pretty and graceful for grouping, and *Heuchera bryzoides,* var. *gracillima,* very neat for decorative purposes; and by the Eastern and Old Town Nurseries.

German irises was a prominent feature. Prizes were won by T. C. Thurlow's Sons Co., E. M. Dunphe, and J. K. Alexander. Among noteworthy varieties were pallida and its varieties; Madame Paquette, claret; Clio, light and dark purple, falls edged with white; Mrs. H. Darwin, white; Victorine, white and violet mottled; Lorelei, blue and creamy white; Gagus, crimson falls, light yellow edges; Maori King, crimson and yellow, falls gold margined.

Early peonies were shown by Mrs. J. L. Gardner, William Whit-

man, James McKissock and seedlings by Walter Hunnewell, Dr. C. S. Minot, and Geo. W. Page. Jackson Dawson staged an interesting lot of seedling roses and was awarded a First Class Certificate.

Miss Cornelia Warren showed a fine group of Hydrangea Otaksa besides roses Sunburst, Mme. Plantier, Richmond, Killarney, Lady Hillingdon, and Austrian Briar. She showed also poppies and an excellent group of *Oncidium flexuosum*. Mrs. Frederick Ayer, George Page, gardener, had a splendid lot of Canterbury bells, and Mrs. E. M. Gill showed seasonable cut flowers.

The Peony Show, June 20, was put off a week and was rather late for some of the best varieties. Dr. C. S. Minot showed a new seedling named Mrs. C. S. Minot, a silver white of fine form and deliciously scented. It was awarded a First Class Certificate of Merit. George N. Smith of Wellesley had a nice lot of commercial sorts.

R. & J. Farquhar & Co. had a representative collection neatly displayed which was awarded a Silver Medal. Among them were Couronne d'Or, yellow and white; Limoe, pink; Mme. de Verneville, white; Agnes Mary Kelway, anemone flowered, white and yellow; Venus, blush; Louis Van Houtte, red; Charles W. Parker, red; Snowball; Victor Hugo, red; Baron Rothschild, pink, raised yellow center; Princess Beatrice, light pink; and Mrs. James Farquhar, pink.

Among the varieties exhibited by T. C. Thurlow's Sons Co., were Mrs. Manning, red. The ten best in their collection were Baroness Schroeder, white; Mlle. Debuissons, light pink; Mlle. Boncharlot, pink; Mme. Émile Galle, light pink; Dr. Caillot, deep pink; Mlle. Rosseau, white; Mme. August Dessert, light pink; Edward Andre, red; Felix Crousse, red; and Festiva maxima, white.

The best bloom in the exhibition was shown by Arthur H. Fewkes, named Mt. Blanc.

The Eastern Nurseries had a fine lot of herbaceous flowers, among them *Heuchera bryzoides*, light and dainty; *Valeriana officinalis, Clematis recta, Gaillardia grandiflora, Armeria cephalotes, Alyssum rostratum, Aster alpinus, Oenothera glauca, Centaurea dealbata, Aquilegia Jaeschkanii, Achillea tomentosa, Dianthus atrorubens, Campanula persicifolia, Centaurea montana*, sweet williams,

and the Eldorado coreopsis. Thurlow's pink Kalmia was very attractive and Mrs. E. M. Gill had a display of seasonable cut flowers. The Mount Desert Nurseries made a very fine display of *Eremurus Elwesii*, the Lohengrin iris, and the rare *Saxifraga pyramidalis*.

The Rose Show, June 26, was excellent in every way. The growing popularity of the Hybrid Tea rose was shown by numerous displays and close competition. Miss S. B. Fay, A. W. Preston, Albert Geiger, and T. N. Cook were the principal exhibitors and all were competitors.

Mr. Preston's Queen of May, a magnificent coppery yellow was very much admired and Miss Fay's Lyon Rose, a large salmon pink came in for a good deal of attention. The new climber, Mrs. Henry Sargent Dawson, is full of promise. Miss Susan Minns made a pretty display of the old York and Lancaster rose and was awarded Honorable Mention.

Some of the best Hybrid Teas in Miss Fay's lot were Mrs. Aaron Ward, coppery yellow; Miss Page Roberts, orange red; Prince of Bulgaria, salmon pink; Caroline Testout, lavender pink; The Lyon, salmon pink; Dean Hole, deep pink; Mrs. J. B. Clark, cerise; Antoine Revoire, creamy pink; Miss Cynthia Forde, red; Souv. Pres. Carnot, pink tinted white; and Gen. McArthur, red. Among Hybrid Perpetuals Miss Fay's exhibit was quite up to the standard, but contained no new or unusual varieties; all have been noted before.

T. C. Thurlow's Sons' Co. made a large display of peonies and were awarded a special Gold Medal for their work in popularizing the peony. William Whitman staged a showy group of sweet williams and larkspurs and Mrs. J. L. Gardner an elegant table of Streptocarpus.

A. H. Fewkes had some late peonies. The Mount Desert Nurseries had a large collection of peonies and other herbaceous flowers for which they were awarded a Silver Medal. William Nicholson showed the always interesting Edelweiss.

Sweet Pea Exhibition.

The Sweet Pea Show, July 11, was quite up to previous exhibitions. The best varieties shown were as follow: White, White Spencer; Crimson or Scarlet, King Edward, Spencer; Carmine, John Ingman; Yellow, Floradale Fairy; Blue, Wedgewood; Blush, Millie Maslis; Deep Pink, Countess Spencer; Cream Pink, Mrs. C. W. Breadmore; Orange, Thomas Stevenson; Lavender, Asta Ohn; Purple, Tennant Spencer; Maroon, King Manoel; Picotee Edged, Blue Picotee; Striped and Flaked Rose, Aurora Spencer; Striped and Flaked Blue, Senator Spencer; Bicolor, Mrs. Cuthbertson.

Among amateurs the varieties for the most part were the same and quality almost as good as that shown by professional growers, which goes to show, as much as anything, that the sweet pea is "everybody's flower."

William Whitman was awarded a Silver Medal for an excellent display of hybrid larkspurs, and R. & J. Farquhar & Co. received a Silver Medal for excellence in display of herbaceous flowers. A Cultural Certificate was given Eric H. Wetterlow, gardener to Mrs. Lester Leland, for a well-grown lot of Achimenes. Mrs. J. L. Gardner and Miss Cornelia Warren had neat displays of gloxinias. Dr. Harris Kennedy and T. C. Thurlow's Sons Co. exhibited Japanese irises, and the Old Town Nurseries herbaceous flowers. William Whitman had a fine lot of *Lilium Hansoni* and Mrs. Sarah C. Sears was awarded a Silver Medal for seedling larkspurs.

The Gladiolus and Phlox Exhibition.

It appears to have been early for gladioli and phloxes on August 8th and not all the usual exhibitors were represented.

Mrs. Frederick Ayer won in the general display with a very fine collection of gladioli. Chamberlain and Gage made a beautiful display which included the lovely Mrs. Chamberlain, a white tinted flower. William Sim exhibited a fine collection of commercial sorts for John Lewis Childs of New York. The gladiolus

America shown by Mr. Sim won the first prize for the best vase of one hundred spikes, and Honorable Mention was made of the Mrs. O. W. Halliday, a fine tinted pink variety shown by C. W. Brown of Ashland.

The big feature of this show was a grand display of fancy caladiums by Thomas E. Proctor of Topsfield. Nothing like it has ever been seen before in the halls of the Society. A Gold Medal was awarded Mr. Proctor and a Silver Medal (Cultural) was awarded the gardener, James Marlborough.

Herbaceous phloxes were shown by T. C. Thurlow's Sons Co., Bay State Nurseries, Eastern Nurseries, and F. J. Rea. The Eastern and Bay State Nurseries made extensive displays of hardy flowers. The Mount Desert Nurseries made a special display of Aconitums and Astilbes. For Aconitums they were awarded a Silver Medal and for Astilbe Juno and Silver White First Class Certificates.

R. & J. Farquhar & Co. made an artistic display of hardy flowers for which they were awarded Honorable Mention. Noteworthy among them were Spark's variety of *Aconitum napellus*, *Viola cornuta atropurpurea*, of the Violetta type, *Lilium Henryi*, Buddleias in variety, and *Sorbaria glabrata*.

The Dahlia Exhibition.

The Dahlia Show came on September 12. It seems that most florists' flowers have their day. Popularity ebbs and flows. The dahlia among them holds steadiest of all. The dahlia fad is a lone fad. The dahlia faddist seldom has another. The same exhibitors come every Dahlia Show. There is the same crowd of admirers and they vanish, not to be seen again for another year.

Still the dahlia is a gorgeous flower and it has a fascination for a large number of people, as was shown by the immense throng that filled Horticultural Hall on Sunday, September 13. It is always so. The last Dahlia Show was the best we have had for years. It filled the Main Hall and overflowed into the smaller one. The flowers were of high quality and competition close. In some classes there were as many as seven competitors and in the general display

some exhibitors had 250 named varieties, and the least over 100.

A. W. Preston and T. N. Cook had displays of Hybrid Tea roses. William Whitman had a good display in yellow, white, and red, made up of zinnias, gladioli, dahlias, and marigolds.

The Eastern Nurseries made an extensive exhibit of autumn flowers, mostly Composites, and a large display of phloxes of which the Elizabeth Campbell, clear pink, and Jeanne d'Arc, white, were especially noteworthy. Mrs. F. C. Upham of Melrose had a fine display of wild flowers, carefully named.

Sisson and Thurston showed long-stemmed dahlias very effectively. William Nicholson was awarded a First Class Certificate for *Buddleia variabilis* in variety and Mrs. E. M. Gill had seasonable flowers.

The Chrysanthemum Show.

The Chrysanthemum Show has become noted more for other good plants than chrysanthemums. To be sure we had a few at the exhibition of November 5–8, enough to make a quorum of specimens. While not as large as formerly they were neat and well worth the name. The varieties used in J. S. Bailey's group, which won the first prize, were Mrs. Duckham, yellow; Dr. Enguehard, pink; Theo, creamy white; and Garza, white. A. M. Davenport's Garza won the first prize for the best plant in the exhibition. Garza has probably taken more honors than any chrysanthemum plant we know.

There seems to be no letting up in size of specimen blooms. It is doubtful if we ever had better or larger blooms than those shown by Col. H. E. Converse, E. A. Clark, Galen Stone, Lester Leland, and W. S. Russell. It may be interesting to know just what today are considered the best varieties for exhibition blooms so we give the names and colors of a number of the best Japanese varieties: James Fraser, Queenie Chandler, Chelton, Mrs. Duckham, yellow; Leilia Filkins, Marquis Venosti, Alice Lemon, pink; Mrs. R. D. Foote, Miss Alice Finch, crimson; Annie E. Angus, Nellie Josier, Mrs. Gilbert Drabble, William Turner, Onunda, white; Meudon, Reginald Vallis, William Mease, red; Mary Mason, Pockett's Surprise, bronze.

The Messrs. Farquhar put up an excellent decorative group of flowering and foliage plants not entered in competition and the Breck, Robinson Co. made an interesting display of coniferous trees and shrubs in tubs.

The prize for the large decorative group was won by the W. W. Edgar Company. This firm did more than was required to win the prize which was indeed most creditable. The material was excellent and the arrangement bold and handsome.

F. P. Putnam of Tewksbury staged a beautiful lot of seedling single chrysanthemums which showed much improvement in the type. Mrs. Lester Leland exhibited some wonderful specimens of Begonia Gloire de Lorraine and the gardener, Eric H. Wetterlow, was awarded a Cultural Certificate for Turnford Hall, a fine white-flowered variety.

Cattleys were a feature of F. J. Dolansky's group which showed much improvement in arrangement. J. T. Butterworth had some pretty and unusual plants in his orchid group, notably, *Miltonia Morelliana*, the Black Diamond.

A Silver Medal was awarded Edwin S. Webster for Begonia Mrs. Heal, one of the winter-flowering hybrids belonging to the Lorraine type. A Silver Medal went to the Waban Rose Conservatories for the rose Mrs. Moorfield Storey, a sweetly-scented, pink-tinted variety, with long stems and handsome foliage. Its lasting qualities were remarkable and it kept in first-rate condition throughout the show.

Mrs. E. M. Gill made a pretty display of Dipladenia and Allamanda blooms. Thomas T. Watt made an interesting display of unusual plants, among them *Strelitzia regina*, *Statice Holfordi*, *Saxifraga sarmentosa*, and *Saintpaulia ionantha*. Peter Fisher's carnation Alice was awarded a Silver Medal. It is a finely formed light pink commercial variety.

On November 28th Walter Hunnewell was awarded a First Class Certificate for Cattleya Minna (*Cattleya Trianae* × *Laelio-Cattleya eximia*).

The Convention Show.

The Massachusetts Horticultural Society held a flower show, complimentary to the Society of American Florists, during the week of August 20th.

William Sim made a large exhibit of gladioli and was awarded a Gold Medal for excellence in display, as well as a First Class Cultural Certificate. B. Hammond Tracy also made a display of gladioli and was awarded a Silver Medal for excellence in display. John Lewis Childs was awarded a Silver Medal for an exhibit of gladioli.

Honorable Mention was awarded the following named exhibitors:

Old Town Nurseries for display of gladioli and herbaceous flowers.

Mount Desert Nurseries for Aconitums.

R. & J. Farquhar & Co. for lilies and herbaceous flowers.

Mrs. Frederick Ayer for fuchsias.

E. F. Dwyer for dahlias.

Eastern Nurseries for herbaceous flowers.

Walter Hunnewell for Buddleias.

T. C. Thurlow's Sons Co. for phloxes.

W. W. Edgar Co. for display of commercial plants and flowers.

T. D. Hatfield
Arthur H. Fewkes
Donald McKenzie
James Marlborough
William Nicholson
William Sim

Committee on Plants and Flowers.

PRIZES AND GRATUITIES AWARDED FOR PLANTS AND FLOWERS.

1914.

Midwinter Flower Show.

January 31 and February 1.

Begonia Gloire de Lorraine.— Six plants in pots:
1st, Mrs. J. L. Gardner, $8; 2d, A. M. Davenport, $6.

Begonia Glory of Cincinnati.— Six plants in pots:
1st, Mrs. Lester Leland, $8; 2d, A. M. Davenport, $6.

Freesias.— Six eight-inch pots:
1st, William Whitman, $6; 2d, Miss Cornelia Warren, $4.

Primula sinensis.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, William Whitman, $6; 3d, Mrs. J. L. Gardner, $4.

Primula Kewensis.— Six plants in not less than six-inch pots:
1st, E. A. Clark, $8.

Primula stellata.— Eight plants in not less than six-inch pots:
1st, Mrs. J. L. Gardner, $8; 2d, William Whitman, $6.

Primula obconica.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, William Whitman, $6; 3d, Mrs. J. L. Gardner, $4.

Primula malacoides.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, Mrs. Frederick Ayer, $6; 3d, Weld Garden, $4.

Roman Hyacinths.— White, eight six-inch pans:
1st, William Whitman, $6; 2d, Mrs. J. L. Gardner, $4.

Orchids.— Calanthes, six pots, in bloom:
1st, Wheeler & Co., $10.

Three plants in bloom other than Calanthes:
1st, F. J. Dolansky, $10; 2d, Mrs. J. L. Gardner, $8; 3d, F. J. Dolansky, $6.

Specimen plant in bloom, other than Calanthes:
1st, Col. Charles Pfaff, $5: 2d, Wheeler & Co., $4; 3d, Mrs. J. L. Gardner. $3.

Carnations.— Vase of fifty cut blooms, not less than five varieties, with foliage:
1st, M. A. Patten, $10; 2d, A. A. Pembroke, $6.

Vase of twenty-five cut blooms, not less than three varieties, open to private growers only:
1st, E. D. Jordan, $5; 2d, Mrs. Frederick Ayer, $4.
Fifty blooms any white variety:
1st, A. A. Pembroke, White Wonder, $6; 2d, A. A. Pembroke, White Enchantress, $4.
Fifty blooms any red variety:
1st, A. A. Pembroke, Commodore, $6.
Fifty blooms any light pink variety:
1st, J. W. Minot Co., Winsor, $6.
Fifty blooms any flesh pink variety:
1st, A. A. Pembroke, Pink Delight, $6; 2d, Strcuts, Pink Delight, $4.
Fifty blooms any dark pink variety:
1st, A. A. Pembroke, Rosette, $6.
Fifty blooms any crimson variety:
1st. J. W. Minot Co., Pocahontas, $6.
Fifty blooms any scarlet variety:
1st, J. W. Minot Co., Beacon, $6.
Fifty blooms any white variegated variety:
1st, A. A. Pembroke, Benora, $6.

FREESIAS.— One hundred sprays:
1st, F. W. Fletcher, $8.

VIOLETS.— Bunch of one hundred blooms of any single variety:
1st, Miss Cornelia Warren, $3; 2d, E. Bingham, $2.
Bunch of one hundred blooms of any double variety:
1st, E. Bingham, $3.

SWEET PEAS.— Two vases, distinct varieties, one hundred sprays in each:
1st, Thomas Roland, $5.

Gratuities:—

Mrs. Frederick Ayer, group of *Erica melanthera*, $8.
Miss Cornelia Warren, two specimen plants of *Erica melanthera*, $3.
Mrs. J. L. Gardner, group of Cyclamen, $4.
Miss Cornelia Warren, *Lachenalia Nelsoni*, $1.
" " " two specimen plants of *Cytisus racemosus*, $4.
A. M. Davenport, collection of Gloire de Lorraine Begonias, white and pink, with ferns, $5.
Wheeler & Co., cut *Phalaenopsis amabilis*, $2.
Patten & Co., vase of Carnation Princess Dagmar, $3.
Thomas Roland, collection of Sweet Peas, $3.
Mrs. C. G. Weld, vase of Tulips, $1.

Spring Exhibition.

March 12, 13, 14, and 15.

Azalea indica.— Four plants, four varieties:
1st, W. W. Edgar Co., $15.
Three plants, distinct varieties, not less than thirty-six inches in diameter; for private growers only:
1st, William Whitman, $12.
Specimen plant:
1st, Miss Cornelia Warren, $10; 2d, A. W. Preston, $6.
Palms.— Pair in pots or tubs:
1st, William Whitman, $12; 2d, William Whitman, $10.
Specimen palm in bloom:
1st, William Whitman, $10.
Acacias.— Specimen plant in bloom:
1st, Weld Garden, $8; 2d, Mrs. C. G. Weld, $6; 3d, Weld Garden, $4.
Hard Wooded Greenhouse Plants.— Six specimens, other than Acacias, Azaleas, and Ericas:
1st, Weld Garden, $15; 2d, W. W. Edgar Co., $10.
Specimen plant:
W. W. Edgar Co., $10.
Rambler Roses.— Three plants, distinct varieties:
2d, W. W. Edgar Co., $8.
Group of Roses.— Not less than twelve plants, all classes admissible:
1st, W. W. Edgar Co., $40, and Silver Medal; 2d, Miss Cornelia Warren, $30, and Bronze Medal.
Cyclamens.— Twelve plants in not over seven-inch pots:
1st, Weld Garden, $15; 2d, Mrs. Lester Leland, $10; 3d, Mrs. J. L. Gardner, $6.
Six plants in not over ten-inch pots:
1st, Mrs. Lester Leland, $25; 2d, Weld Garden, $15; 3d, Mrs. J. L. Gardner, $10.
Specimen plant:
Mrs. Lester Leland, $5.
Cinerarias.— Grandiflora type, six plants:
1st, Mrs. J. L. Gardner, $12.
Specimen plant:
Mrs. J. L. Gardner, $5.
Stellata type, six plants:
1st, Mrs. J. L. Gardner, $12; 2d, William Whitman, $8.
Specimen plant:
Mrs. J. L. Gardner, $5.

SCHIZANTHUS.— Six plants:
1st, Mrs. J. L. Gardner, $8; 2d, Miss Cornelia Warren, $6; 3d, Weld Garden, $4.

HYACINTHS.—Six pans not exceeding ten inches in diameter, six bulbs of one distinct variety in each:
1st, William Whitman, $12; 2d, E. A. Clark, $8.

Single pan not exceeding twelve inches in diameter, six bulbs of one distinct variety in each;
1st, E. A. Clark, $4; 2d, Francis Skinner, $3; 3d, E. A. Clark, $2.

Single pan not exceeding twelve inches in diameter, ten bulbs of one variety:
1st, William Whitman, $3; 2d, Francis Skinner, $2.

Two eight-inch pans, two distinct varieties; for amateurs only:
1st, Miss M. A. Rand, $5; 2d. H. L. Rand, $3; 3d, Miss M. A. Rand, $2.

SINGLE TULIPS.— Six eight-inch pans, one distinct variety in each:
1st, William Whitman, $10; 2d, William Whitman, $8; 3d, A. W. Preston, $6.

Joost van Vondel, white, three eight-inch pans:
1st, William Whitman, $5.

Any other white variety, three eight-inch pans:
1st, William Whitman, $5; 2d, A. W. Preston, $3.

Mon Tresor, three eight-inch pans:
1st, William Whitman, $5.

Any other yellow variety, three eight-inch pans:
1st, William Whitman, $5; 2d, A. W. Preston, $3.

Vermilion Brilliant, three eight-inch pans:
1st, A. W. Preston, $5.

Any other red variety, three eight-inch pans:
1st, A. W. Preston, $5.

Keiserkroon, three eight-inch pans:
1st, William Whitman, $5.

Pink Beauty, three eight-inch pans:
1st, William Whitman, $5.

Any other pink or pink and white variety, three eight-inch pans:
1st, William Whitman, $5; 2d, A. W. Preston, $3.

Duchess of Parma, three eight-inch pans:
1st, William Whitman, $5.

Two eight-inch pans, two varieties; for amateurs only:
1st, H. L. Rand, $5; 2d, Miss M. A. Rand, $3; 3d, Miss M. A. Rand, $2.

DOUBLE TULIPS.— Six eight-inch pans, in not less than three varieties:
1st, William Whitman, $10; 2d, A. W. Preston, $8; 3d, Francis Skinner, $6.

NARCISSUSES.— Collection of Large Trumpet varieties, twelve eight-inch pots or pans, one distinct variety in each:
1st, William Whitman, $12.

Large Trumpet varieties, four eight-inch pots or pans:
1st, William Whitman, $6; 2d, A. W. Preston, $4; 3d, William Whitman, $3.

Collection of Short Trumpet varieties, ten eight-inch pots or pans, one distinct variety in each:
1st, William Whitman, $12.

Short Trumpet varieties, four eight-inch pots or pans, one distinct variety in each:
1st, William Whitman, $6; 2d, A. W. Preston, $4; 3d, William Whitman, $3.

Two eight-inch pans, two varieties; for amateurs only:
1st, Miss M. A. Rand, $3; 2d, H. L. Rand, $2; 3d, Miss M. A. Rand, $1.

CROCUS.— Three eight-inch pans, one distinct variety in each:
1st, Mrs. J. L. Gardner, $4.

LILY OF THE VALLEY.— Six six-inch pots:
1st, William Whitman, $6.

AMARYLLIS.— Twelve pots, distinct varieties:
1st, Mrs. J. L. Gardner, $15.

LILIUM LONGIFLORUM.— Six pots:
1st, W. W. Edgar Co., $10; 2d, Francis Skinner, $8.

GENERAL DISPLAY OF SPRING BULBOUS PLANTS.— All classes, to be arranged with foliage plants:
1st, Mrs. J. L. Gardner, $30.

FORCED BULBS.— Six pans, six inches in diameter, grown without the aid of a frame or greenhouse:
1st, H. L. Rand, $10; 2d, Miss M. A. Rand, $8; 3d, Miss M. A. Rand, $6.

ORCHIDS.— Group of plants arranged for effect with ferns or other foliage plants, to cover not less than fifty square feet:
1st, Weld Garden, $40, and Silver Medal; 2d, Edward MacMulkin, $30, and Bronze Medal.

Specimen plant:
1st, Miss Cornelia Warren, $6; 2d, Joshua Lawson, $4; 3d, F. J. Dolansky, $2.

ROSES.— Twenty-five blooms of Killarney:
1st, Waban Rose Conservatories, $12.

Twenty-five blooms of Mrs. Charles Russell:
1st, Waban Rose Conservatories, $12.

Twenty-five blooms, any new named variety not in commerce:
Montgomery Co., The Hadley, Silver Medal.

CARNATIONS.— Vase of one hundred cut blooms of one variety, with foliage:
1st, Albert Roper, Mrs. Alice Coombs, $12; 2d, A. A. Pembroke, Benora, $8.

Fifty blooms any named dark pink variety:
1st, A. A. Pembroke, Rosette, $5.

Fifty blooms any named scarlet variety:
1st, A. A. Pembroke, Commodore, $5.
Fifty blooms any named white variegated variety:
1st, A. A. Pembroke, Benora, $5; 2d, James Wheeler, Benora, $4.
Fifty blooms any named white variety:
1st, A. A. Pembroke, White Wonder, $5; 2d, A. A. Pembroke, White Enchantress, $4.

VIOLETS.— Bunch of one hundred blooms of any single variety:
1st, Esty Bros., $3; 2d, Esty Bros., $2.

MARGUERITES.— One hundred blooms, yellow:
1st, James Wheeler, $6.

ANTIRRHINUMS.— Vase of twenty-five spikes:
1st, G. E. Buxton, $6; 2d, G. E. Buxton, $4.

CAMELLIAS.— Collection of twelve blooms:
1st, Walter Angus, $5.

GARDENIAS.— Collection of twelve blooms:
1st, F. J. Dolansky, $5; 2d, E. B. Dane, $4.

TABLE DECORATION.— For the best table decoration laid for eight covers:
1st, F. E. Palmer; $50; 2d, Sidney Hoffman, $30; 3d, Edward MacMulkin, $20.

Gratuities:—

T. T. Watt, Azaleas, $2.
A. W. Preston, display of Azaleas and bulbous plants, $4.
Edward MacMulkin, six Bougainvillea plants, $3.
Mrs. Lester Leland, specially trained plants, $8.
Mrs. J. L. Gardner, six plants Cineraria Reading Gem, $3.
Miss Cornelia Warren, display of flowering plants, $20.
W. W. Edgar Co., " " " " $20.
Weld Garden, " " " " $15.
William Whitman, display of bulbous plants, $3.
Francis Skinner, " " " " $2.
Patten & Co., vase of Carnation Princess Dagmar, $2.
S. J. Goddard, six vases of Carnations, $10.
R. D. Kimball, vase of Carnations, $2.
J. H. Leach & Son, " " " $2.
Walter Angus, Cherokee Roses and Camellia blooms, $5.
Edward MacMulkin, annual Chrysanthemums, $1.
T. T. Watt, display of Camellias, *Statice Holfordi*, and *Strelitzia Reginae*, $2.
G. W. Page, three pans *Cypripedium acaule*, $1.
Edward MacMulkin, Orchid decoration, $5.
Mrs. E. M. Gill, display of cut flowers, $3.

May Exhibition.

May 16 and 17.

Calceolarias.— Large Flowered, six varieties, in pots:
1st, E. A. Clark, $12; 2d, Mrs. J. L. Gardner, $8.
Stewartii, six plants in pots:
1st, E. A. Clark, $12.
Pelargoniums.— Six named Show or Fancy varieties, in not less than eight-inch pots, in bloom:
1st, William Whitman, $10.
Hardy Narcissuses.— Twenty-five blooms of Emperor:
1st, William Whitman, $3.
Twenty-five blooms of Empress:
1st, William Whitman, $3.
Twelve blooms of Glory of Leiden:
1st, C. S. Minot, $3; 2d, William Whitman, $2.
Collection of twenty vases of not less than six named varieties:
1st, William Whitman, $8; 2d, William Whitman, $6.
Pansies.— Forty-eight blooms, not less than twenty-four varieties:
1st, William Whitman, $3; 2d, Oliver Ames, $2; 3d, Miss Cornelia Warren, $1.
Native Plants.— Collection, named, one bottle of each kind:
2d, Miss Ruth G. Taylor, $4.

Gratuities:—

Miss Cornelia Warren, Calceolaria Golden Gem, $8.
William Whitman, collection of Pelargoniums, $4.
" " " " Tulips, $8.
" " " " Narcissuses, $1.
H. S. Rand, collection of scented-leaved Geraniums, $5, and First Class Certificate of Merit.
Mrs. J. L. Gardner, collection of Orchids, $12.
E. A. Clark, two Laburnums in bloom, $5.
" " " standard *Hydrangea Otaksa*, $5.
Mrs. J. L. Gardner, specimen *Gloriosa Rothschildiana*, $2.
" " " " vase of Clarkia Salmon Queen, $1.
T. T. Watt, collection of cut Petunias, $1.
Patten & Co., vase of Carnation Princess Dagmar, $2.
Miss Cornelia Warren, vase of white Carnations, $1.
" " " vase of Poppies, $1.
" " " display of Gladiolus Blushing Bride, $4.
Mrs. M. W. Chadbourne, display of cut shrubs, $2.

Mrs. E. M. Gill, collection of cut flowers, $3.
Lowthorpe School of Horticulture, " " " " $1.
Mrs. J. L. Gardner, " " " " $1.

Rhododendron Exhibition.

June 13 and 14.

Orchids.— Display of plants, not less than four genera, arranged for effect with foliage plants:
1st, Mrs. J. L. Gardner, $25; 2d, Mrs. J. L. Gardner, $15.

H. H. Hunnewell Fund No. 3.

Rhododendrons.— Six distinct varieties, one truss of each:
1st, T. C. Thurlow's Sons Co., $3.

Samuel Appleton Fund.

German Irises.— Twenty-four vases of three trusses each, not less than twelve varieties:
1st, T. C. Thurlow's Sons Co., $5; 2d, E. M. Dunphe, $3; 3d, J. K. Alexander, $2.

Hardy Herbaceous Flowers.— Twenty-five distinct species and varieties, not less than ten genera:
1st, Eastern Nurseries, $10.

Gratuities:—

William Whitman, collection of German Iris and Peonies, $10.
T. C. Thurlow's Sons Co., display of German Iris, $2.
J. K. Alexander, " " " " $1.
G. W. Page, collection of Hemerocallis seedlings and German Iris, $2.
Mrs. J. L. Gardner, collection of Peonies, $5.
Mrs. E. M. Gill, display of Peonies, $5.
Wellesley Nurseries, " " " $5.
James McKissock, " " " $2.
T. C. Thurlow's Sons Co., " " " $1.
Mrs. J. L. Gardner, two vases of Peonies, $2.
G. W. Page, collection of seedling Peonies, $2.
Miss Cornelia Warren, collection of Roses and Poppies, $3.
Mrs. Frederick Ayer, display of Canterbury Bells, $3.
Miss Cornelia Warren, display of *Oncidium flexuosum*, $6.

F. J. Dolansky, specimen *Cattleya Mossiae*, $5.
E. A. Clark, specimen *Dendrobium thyrsiflorum*, $2.
Miss Cornelia Warren, display of Hydrangeas, $4.
Old Town Nurseries, collection of herbaceous flowers, $4.
Mrs. M. W. Chadbourne, display of seasonable flowers, $2.

Peony Exhibition.

June 20 and 21.

Herbaceous Peonies.— Collection of twenty named varieties, double, one flower of each:
1st, A. H. Fewkes, $10; 2d, James McKissock, $6; 3d, T. C. Thurlow's Sons Co., $4.
Collection of ten named varieties, double, three flowers of each:
1st, T. C. Thurlow's Sons Co., $10; 2d, A. W. Preston, $6; 3d, James McKissock, $4.
Specimen bloom, double:
1st, A. H. Fewkes, $2; 2d, James McKissock, $1.
Collection of twelve named varieties, single, one bloom of each:
1st, T. C. Thurlow's Sons Co., $4.
Collection of twelve named varieties, Japanese Single:
1st, T. C. Thurlow's Sons Co., $4.
Collection of six named double varieties, White, one flower of each:
1st, C. S. Minot, $3; 2d, James McKissock, $2; 3d, T. C. Thurlow's Sons Co., $1.
Collection of six named double varieties, Rose Pink, one flower of each:
1st, James McKissock, $3.
Collection of six named double varieties, Salmon Pink, one flower of each:
1st, T. C. Thurlow's Sons Co., $3.
Collection of six named double varieties, Red or Crimson, one flower of each:
1st, T. C. Thurlow's Sons Co., $3.
Collection of six named double varieties, any other color, one flower of each:
1st, A. W. Preston, $3.
Vase of twenty-five blooms, double, White or Blush:
1st, H. F. Chase, $5; 2d, A. H. Fewkes, $3; 3d, William Whitman, $2.
Vase of twenty-five blooms, double, Pink or Rose:
1st, T. C. Thurlow's Sons Co., $5; 2d, T. C. Thurlow's Sons Co., $3; 3d, James McKissock, $2.
Vase of twenty-five blooms, double, Red or Crimson:
1st, T. C. Thurlow's Sons Co., $5; 2d, Wilfrid Wheeler, $3.

Collection of twelve named varieties, double, one flower of each; for non-commercial growers only:
1st, C. S. Minot, $6; 2d, William Whitman, $4; 3d, A. W. Preston, $3.
Collection of twelve blooms, Pink; for private gardeners only:
1st, William Whitman, $3.
Collection of twelve blooms, White; for private gardeners only:
1st, William Whitman, $3; 2d, A. W. Preston, $2.
Collection of twelve blooms, Red; for private gardeners only:
1st, William Whitman, $3; 2d, William Whitman, $2.

Gratuities:—

Wellesley Nurseries, display of Peonies, $5.
William Whitman, " " " $4.
T. C. Thurlow's Sons Co., " " " $3.
J. K. Alexander, " " " $2.
A. W. Preston, " " " $1.
A. H. Fewkes, " " " $1.
William Whitman, display of Hybrid Roses, $5.
" " display of *Kalmia latifolia*, $4.
Lowthorpe School of Horticulture, display of Sweet Williams, $1.
Eastern Nurseries, collection of perennials, $10.
Old Town Nurseries, " " " $5.
T. C. Thurlow's Sons Co., three vases of cut flowers, $3.
Mrs. E. M. Gill, display of cut flowers, $3.
Mrs. M. W. Chadbourne, " " " " $2.

Rose and Strawberry Exhibition.

June 27 and 28.

Gloxinias.— Six plants in not less than six-inch pots:
1st, Mrs. J. L. Gardner, $5.

Theodore Lyman Fund No. 2.

Hardy Roses.— Collection, named, not less than twenty varieties, filling fifty vases, one rose in each vase:
1st, Miss S. B. Fay, $20; 2d, A. W. Preston, $15; 3d, T. N. Cook, $10.

John C. Chaffin Fund.

Best three blooms of any white Hybrid Perpetual Rose:
1st, Robert Seaver, Frau Karl Druschki, $5.

Best three blooms of any Pink Hybrid Perpetual Rose:
1st, Robert Seaver, Marie Finger, $5.
Best three blooms of any Red Hybrid Perpetual Rose:
1st, Robert Seaver, Gen. Jacqueminot, $5; 2d, Robert Seaver, Ulrich Brunner, $3.
Basket of Hybrid Perpetual Roses, artistically arranged:
1st, Robert Seaver, $5; 2d, Robert Seaver, $3.

Society's Prizes.

HYBRID PERPETUAL ROSES.— Twelve named varieties, three of each:
1st, Miss S. B. Fay; $12; T. N. Cook, $8.
Six named varieties, three of each:
1st, Miss S. B. Fay, $6.
Twenty-four named varieties, one of each:
1st, William Whitman, $8.
Twelve named varieties, one of each:
1st, A. F. Estabrook, $4; 2d, Col. Frederick Mason, $3.
Six named varieties, one of each:
1st, E. K. Butler, $3; 2d, Miss S. B. Fay, $2; 3d, Col. Frederick Mason, $1.
HYBRID TEA ROSES.— Collection of twelve varieties, three blooms each:
1st, Miss S. B. Fay, $15; 2d, A. W. Preston, $10; 3d, Albert Geiger, Jr., $6.
Best three blooms of a Hybrid Tea variety introduced since 1909:
1st, A. W. Preston, $3; 2d, A. W. Preston, $2; 3d, T. N. Cook, $1.
Six blooms, any White variety:
1st, Mrs. Frederick Ayer, $3.
Six blooms, any Yellow variety:
1st, Mrs. Frederick Ayer, $3; 2d, A. W. Preston, $2.
Six blooms, any Pink variety:
1st, E. K. Butler, $3; 2d, A. W. Preston, $2; 3d, A. F. Estabrook, $1.
Six blooms, any Red variety:
1st, A. W. Preston, $3; 2d, A. F. Estabrook, $2; 3d, A. W. Preston, $1.
Basket, artistically arranged:
1st, Mrs. Albert Geiger, Jr., $5; 2d, Mrs. Albert Geiger, Jr., $3.
For the most artistic decoration of Roses, with rose foliage, to fill space not exceeding fifty square feet:
1st, Mrs. Frederick Ayer, $30; 2d, Miss S. B. Fay, $20; 3d, T. N. Cook, $10.
SWEET WILLIAMS.— Display, eighteen vases of three trusses each, not less than six varieties:
1st, William Whitman, $5; 2d, Mrs. J. L. Gardner, $4; 3d, William Whitman, $3.

HARDY HERBACEOUS FLOWERS.— Best display:
1st, Old Town Nurseries, Silver Medal; 2d, Eastern Nurseries, Bronze Medal.

PERENNIAL LARKSPURS.— Twelve vases, three spikes each:
1st, William Whitman, $5.

CAMPANULA MEDIUM.— Collection, filling twelve vases, one color in a vase:
1st, William Whitman, $6.

Gratuities:—

Miss Susan Minns, display of York and Lancaster Roses, $1, and Honorable Mention.
Miss Cornelia Warren, display of Roses, $3.
A. W. Preston, " " " $3.
William Whitman, " " " $1.
Mrs. Frederick Ayer, display of Gladioli, $2.
Mrs. J. L. Gardner, Streptocarpus hybrids, $3.
A. W. Preston, display of Sweet Peas, $2.
A. H. Fewkes, display of late Peonies, $2, and Honorable Mention.
Miss Cornelia Warren, display of Hydrangea plants, $5.
William Whitman, display of herbaceous flowers, $4.
Mrs. E. M. Gill, display of cut flowers, $3.
Miss Cornelia Warren, " " " " $2.
E. W. Dwyer, " " " " $1.
Mrs. M. W. Chadbourne, " " " " $1.

SWEET PEA EXHIBITION.

JULY 11 AND 12.

John Allen French Fund.

SWEET PEAS.— Twenty-five sprays, any White variety:
1st, Mrs. W. B. Leeds, $3; 2d, Mrs. Lester Leland, $2; 3d, Mrs. Lester Leland, $1.

Twenty-five sprays, Crimson or Scarlet:
1st, Col. Charles Pfaff, $3; 2d, Col. Charles Pfaff, $2; 3d, Mrs. Lester Leland, $1.

Twenty-five sprays, Carmine:
1st, Mrs. W. B. Leeds, $3; 2d, Col. Charles Pfaff, $2; 3d, Col. Charles Pfaff, $1.

Twenty-five sprays, Yellow:
1st, Miss Fanny Foster, $3; 2d, Mrs. Lester Leland, $2; 3d, Mrs. Lester Leland, $1.
Twenty-five sprays, Blue:
1st, Mrs. Lester Leland, $3; 2d, Miss Fanny Foster, $2; 3d, Mrs. Lester Leland, $1.
Twenty-five sprays, Blush:
1st, Mrs. Lester Leland, $3; 2d, Col. Charles Pfaff, $2; 3d, Mrs. Lester Leland, $1.
Twenty-five sprays, Deep Pink:
1st, Col. Charles Pfaff, $3; 2d, Mrs. P. G. Forbes, $2; 3d, Mrs. Lester Leland, $1.
Twenty-five sprays, Cream Pink:
1st, Col. Charles Pfaff, $3; 2d, Miss Fanny Foster, $2; 3d, Mrs. Lester Leland, $1.
Twenty-five sprays, Orange:
1st, Col. Charles Pfaff, $3; 2d, Mrs. Lester Leland, $2; 3d, Mrs. W. B. Leeds, $1.
Twenty-five sprays, Lavender:
1st, Col. Charles Pfaff, $3; 2d, Mrs. Lester Leland, $2.
Twenty-five sprays, Purple:
1st, Col. Charles Pfaff, $3; 2d, Mrs. Lester Leland, $2; 3d, Miss Fanny Foster, $1.
Twenty-five sprays, Maroon:
1st, Mrs. Lester Leland, $3.
Twenty-five sprays, Picotee-edged:
1st, Miss Fanny Foster, $3.
Twenty-five sprays, Striped or Flaked Red or Rose:
1st, Mrs. W. B. Leeds, $3; 2d, Mrs. W. B. Leeds, $2; 3d, Harry Heeremans, $1.
Twenty-five sprays, Striped or Flaked Blue or Purple:
1st, Col. Charles Pfaff, $3; 2d, Mrs. W. B. Leeds, $2; 3d, E. L. Lewis, $1.
Twenty-five sprays, Bicolor, other than Picotee-edged:
1st, Col. Charles Pfaff, $3; 2d, Miss Fanny Foster, $2; 3d, W. D. Blossom, $1.
For the best decoration of Sweet Peas, cut flowers or growing plants or both:
1st, Penn the Florist, Silver Medal; 2d, Boston Cut Flower Company, Bronze Medal.

Society's Prizes.

(For amateurs only.)

Best vase, White, twelve sprays to a vase:
1st, J. A. Raddin, $3; 2d, Miss I. H. Miller, $2.

Best vase, Pink:
1st, Miss I. H. Miller, $3; 2d, Miss I. H. Miller, $2.
Best vase, Dark Pink:
1st, Miss I. H. Miller, $3; 2d, J. A. Raddin, $2.
Best vase, Lavender:
1st, Miss I. H. Miller, $3; 2d, Alice Hildreth, $2.
Best vase, Salmon:
1st, J. A. Raddin, $3; 2d, Miss I. H. Miller, $2.
Best vase, Crimson or Scarlet:
1st, Miss I. H. Miller, $3; 2d, Thomas Brook, $2.
Best vase, Primrose:
1st, J. A. Raddin, $3; 2d, Michael Cahalan, $2.
Best vase, Scarlet:
1st, J. A. Raddin, $3; 2d, Miss I. H. Miller, $2.
Best vase, any other color:
1st, Miss I. H. Miller, $3; 2d, J. A. Raddin, $2.
Best collection of Sweet Peas, six flowers in a vase:
1st, Alice Hildreth, $6; 2d, Miss I. H. Miller, $4; 3d, J. A. Raddin, $2.

HOLLYHOCKS.— Twenty-four blooms, not less than four varieties:
1st, William Whitman, $3; 2d, William Whitman, $2.

NATIVE PLANTS.— Collection, named, one bottle of each kind:
1st, L. D. Watson, $5; 2d, Mrs. Sarah Hildreth, $4; 3d, Mrs. F. C. Upham, $3; 4th, Miss Ruth G. Taylor, $2.

Gratuities:—

Col. Charles Pfaff, display of Sweet Peas, $3.
William Whitman, display of *Lilium Hansoni*, $2.
Mrs. J. L. Gardner, display of Gloxinias, $3.
Miss Cornelia Warren, " " " $2.
A. W. Preston, Hybrid Tea Roses, $2.
Mrs. Frederick Ayer, display of Gladioli and Roses, $8.
Boston Cut Flower Company, basket of Roses, $3, and Honorable Mention.
T. C. Thurlow's Sons Co., display of Japanese Iris, $8.
Dr. Harris Kennedy, display of *Iris Kaempferi*, $5.
Miss Cornelia Warren, " " " " $3.
William Whitman, display of Hybrid Larkspurs, $10, and Silver Medal.
Mrs. Lester Leland, display of Achimenes, $8.
Miss Cornelia Warren, specimen of Hydrangeas, $2.
Old Town Nurseries, display of hardy flowers, $6.
Eastern Nurseries, " " " " $10.
Miss Cornelia Warren, " " " " $3.
Mrs. E. M. Gill, display of cut flowers, $4.
Gertrude Schulz, " " " " $3.

Gladiolus and Phlox Exhibition.

August 8 and 9.

Perennial Phloxes.— Twelve named varieties, one truss of each:
1st, F. J. Rea, $4; 2d, T. C. Thurlow's Sons Co., $3; 3d, Eastern Nurseries, $2.

General display, in not less than thirty vases, named:
1st, T. C. Thurlow's Sons Co., $8; 2d, F. J. Rea, $6; 3d, Bay State Nurseries, $4.

Twelve trusses, named varieties; for private growers only:
1st, William Whitman, $5.

Gladioli.— Twelve named varieties, one spike of each:
1st, William Sim, $4.

Twelve named varieties, one spike of each; for private growers only:
1st, Miss H. A. Reardon, $4.

Fifty spikes, any named variety:
William Sim, $8.

Display of named and unnamed varieties filling one hundred vases, arranged for effect with any foliage:
1st, Mrs. Frederick Ayer, $15.

Basket or hamper, artistically arranged:
Chamberlain & Gage, $5.

China Asters.— Display of Large Flowered of all classes, named, fifty vases, three flowers in each:
1st, William Whitman, $6.

Twenty-five vases, three flowers in each, all classes:
1st, William Whitman, $4; 2d, William Whitman, $3.

Annuals.— General display, named, thirty species, filling not less than one hundred bottles:
1st, Mrs. J. L. Gardner, $10; 2d, Col. Charles Pfaff, $8; 3d, William Whitman, $6.

Gratuities:—

William Sim, display of Gladioli, $10.
Chamberlain & Gage, " " " $5.
B. H. Tracy, " " " $3.
Miss H. A. Reardon, two vases of Gladioli, $1.
E. F. Dwyer & Son, display of Dahlias, $2.
Gustav Olson, display of Shasta Daisy, $1.
William Nicholson, display of *Buddleia variabilis* varieties, $2, and Honorable Mention.
Bay State Nurseries, display of hardy perennials, $10.
Eastern Nurseries, " " " " $10.

G. W. Page, display of herbaceous flowers, $3.
" " " collection of native flowers, $1.
Miss Cornelia Warren, display of cut flowers, $5.
Mrs. E. M. Gill, " " " " $4.

Dahlia and Fruit Exhibition.

September 12 and 13

Dahlias.— Show or Fancy, twenty-four named varieties:
1st, W. D. Hathaway, $4.
Twelve blooms, named varieties:
1st, P. A. Mansfield, $3; 2d, F. L. Tinkham, $2; 3d, G. H. Walker, $1.
Cactus, twenty-four blooms, named varieties:
1st, Sisson & Thurston, $4; 2d, W. D. Hathaway, $3.
Twelve blooms, named varieties:
1st, Miss Fanny Foster, $3; 2d, P. A. Mansfield, $2; 3d, W. H. Symonds, $1.
Decorative, twenty-four blooms, named varieties:
1st, W. D. Hathaway, $4; 2d, F. L. Tinkham, $3.
Twelve blooms, named varieties:
1st, E. W. Ela, $3; 2d, Mrs. L. M. Towle, $2; 3d, G. H. Walker. $1.
Peony-flowered, twelve blooms, named varieties:
1st, G. L. Stillman, $3; 2d, E. W. Ela, $2; 3d, Sisson & Thurston, $1.
Pompon, twenty-four vases of three blooms each, named varieties:
1st, W. D. Hathaway, $4; 2d, G. L. Stillman, $3.
Twelve vases of three blooms each, named varieties:
1st, Lydia A. Towle, $3.
Single, twelve vases of three blooms each, named varieties:
1st, Sisson & Thurston, $3; 2d, E. W. Ela, $2; 3d, G. L. Stillman, $1.
Largest and best collection of named varieties, one vase of each:
1st, E. F. Dwyer & Son, $8; 2d, G. H. Walker, $6; 3d, G. L. Stillman, $4.
Hardy Herbaceous Flowers.— Best display:
1st, Eastern Nurseries, Silver Medal.
Hybrid Tea Roses.— Twelve varieties, three blooms of each:
1st, T. N. Cook, $5; 2d, A. W. Preston, $4; 3d, T. N. Cook, $3.
Native Plants.— Collection, named, one bottle of each kind:
1st, Mrs. F. C. Upham, $5; 2d, Etta M. Parker, $4; 3d, Ruth G. Taylor, $3.

Gratuities:—

Mrs. F. G. Dodge, display of Dahlias, $4.
Lydia A. Towle, " " " $4.

W. D. Hathaway, display of Dahlias, $4.
W. C. Winter, " " " $2.
G. B. Gill, " " " $2.
G. L. Stillman, collection of Collarette Dahlias, $1.
Fottler, Fiske, Rawson Co., collection of Dahlias and Gladioli, $5.
Eastern Nurseries, display of Herbaceous Phloxes, $8.
William Whitman, display of cut flowers, $5.
Mrs. E. M. Gill, " " " " $3.

Chrysanthemum Show.

November 5, 6, 7, and 8.

Foliage and Flowering Plants.— Best arranged group, covering three hundred square feet:
1st, W. W. Edgar Co., $50.
Best arranged group covering one hundred and fifty square feet:
1st, W. W. Edgar Co., $30; 2d, Mrs. J. L. Gardner, $20.
Orchids.— Best table of Orchids, both plants and flowers, six or more genera, accurately named:
1st, F. J. Dolansky, $50; 2d, J. T. Butterworth, $40.
Best specimen Orchid:
1st, F. J. Dolansky, $10; 2d, J. T. Butterworth, $8; 3d, F. J. Dolansky, $6.
Chrysanthemums.— Four specimen plants, any color or class:
1st, J. S. Bailey, $60.
Two specimen plants, any color or class:
1st, J. S. Bailey, $30.
One specimen plant, white:
1st, A. M. Davenport, $15.
One specimen plant, pink:
1st, J. S. Bailey, $15.
Twenty-five plants, commercial specimens, not less than six varieties, in not over eight-inch pots:
1st, W. H. Elliott, $30; 2d, W. H. Elliott, $20.
Twelve plants, single flowering sorts, not less than three varieties:
1st, Mrs. J. L. Gardner, $15.
Six plants of six different varieties, grown to six stems with one bloom to each stem, in seven-inch pots:
1st, Mrs. Lester Leland, $10; 2d, Mrs. Lester Leland, $8.
Kentias.— Two plants, eight feet high or over:
1st, Mrs. Frederick Ayer, $12; 2d, Mrs. J. L. Gardner, $10; 3d, William Whitman, $8.

SPECIMEN PALM:
William Whitman, $10.

ARECAS.— One or more plants in a tub, eight feet or over in height:
1st, Mrs. Frederick Ayer, $12; 2d, William Whitman, $10; 3d, William Whitman, $8.

BEGONIAS.— Gloire de Lorraine, three plants:
1st, Mrs. Lester Leland, $10; 2d, E. A. Clark, $8; 3d, W. W. Edgar Co., $6.

Glory of Cincinnati, three plants:
1st, Mrs. Lester Leland, $10; 2d, W. W. Edgar Co., $8.

Samuel Appleton Fund.

CHRYSANTHEMUMS.— Best plant on exhibition:
A. M. Davenport, Silver Medal.

Josiah Bradlee Fund.

Twenty-five blooms, of twenty-five distinct varieties:
1st, H. E. Converse, $20; 2d, Mrs. Lester Leland, $15; 3d, G. L. Stone, $10.

Henry A. Gane Memorial Fund.

Best vase of blooms of the Mrs. Jerome Jones or the Yellow Mrs. Jerome Jones:
1st, W. S. Russell, $20; 2d, estate of C. D. Sias, $10.

Society's Prizes.

Twelve blooms, Japanese, named, in vases:
1st, E. A. Clark, $8; 2d, G. L. Stone, $6; 3d, H. E. Converse, $4.

Twelve blooms, Japanese Incurved, named, in vases:
1st, H. E. Converse, $8; 2d, Mrs. Lathrop Brown, $6.

Twelve blooms, Reflexed, named, in vases:
1st, H. E. Converse, $8; 2d, Mrs. Lathrop Brown, $6.

Twelve sprays, Anemone, named, in vases:
1st, F. P. Putnam, $5.

Twelve sprays or branches of Pompon, distinct varieties:
1st, F. P. Putnam, $5; 2d, E. K. Butler, $3.

Vase of blooms on long stems, pink, named:
1st, H. W. Vose, $10; 2d, W. S. Russell, $8; 2d, F. E. Palmer, $6.

Vase of ten blooms on long stems, red, named:
1st, E. A. Clark, $10; 2d, W. S. Russell, $8; 3d, W. W. Edgar Co., $6.
Vase of ten blooms on long stems, white, named:
1st, E. A. Clark, $10; 2d, E. A. Clark, $8; 3d, W. S. Russell, $6.
Vase of ten blooms on long stems, yellow, named:
1st, E. A. Clark, $10; 2d, W. S. Russell, $8; 3d, Mrs. Lathrop Brown, $6.
Collection of sprays of single chrysanthemums filling twenty-five vases:
1st, F. P. Putnam, $12; 2d, Mrs. Frederick Ayer, $10.
Most artistic vase of chrysanthemums with any foliage, arranged for decorative effect:
1st, W. W. Edgar Co., $20; 2d, W. W. Edgar Co., $15; 3d, Mrs. J. C. Phillips, $10.

TABLE DECORATION.— Table decoration of eight covers, chrysanthemums to be the chief feature:
1st, F. E. Palmer, $40; 2d, Sidney Hoffman, $30; 3d, Wax Bros., $20.

CARNATIONS.— Six vases, fifty blooms each; six named varieties:
1st, A. A. Pembroke, $15; 2d, S. J. Goddard, $10.
One hundred blooms, mixed varieties:
1st, A. A. Pembroke, $10; 2d, S. J. Goddard, $6.
Fifty blooms, mixed varieties:
1st, A. A. Pembroke, $5; 2d, Strouts, $3.
Twenty-five blooms, mixed varieties:
1st, Mrs. Frederick Ayer, $4; 2d, estate of C. D. Sias, $3.

Gratuities:—

Waban Rose Conservatories, vase of Chrysanthemum Timothy Eaton, $5.
F. P. Putnam, display of seedling Chrysanthemums, $10.
Miss Cornelia Warren, " " " " $4.
E. J. Norman, " " " " $2.
Mrs. Lester Leland, display of Begonia Gloire de Lorraine in variety, $5.
T. T. Watt, display of rare plants, $5.
Breck, Robinson Co., display of evergreen shrubs, $10.
Mrs. Frederick Ayer, specimen Palm, $2.
William Whitman, pair of specimen Palms, $5.
A. Leuthy, group of Palms, $10.
F. C. Becker, Palms and flowering plants, $10.
T. T. Watt, specimen plant of *Platycerium alcicorne*, $5.
Mrs. E. M. Gill, display of Dipladenia and Allamanda flowers, $3.
Edward MacMulkin, floral decoration, $5.
F. E. Palmer, " " $5.

Additional Awards.

GOLD MEDAL.

March 12. Thomas Roland, three specimen plants *Erica melanthera.*
June 27. T. C. Thurlow's Sons Co., for their work in popularising the Peony.
August 8. Thomas E. Proctor, display of fancy Caladiums.

SILVER MEDAL.

January 3. Bayard Thayer, *Buddleia asiatica.*
" 10. Mrs. J. L. Gardner, group of *Euphorbia Jacquiniaeflora.*
March 12. Waban Rose Conservatories, new Rose Mrs. Moorfield Storey.
" " Cottage Gardens Co., Carnation Matchless.
May 16. F. W. Fletcher & Co., Antirrhinum Nelrose.
June 13. R. & J. Farquhar & Co., display of herbaceous flowers.
" 20. C. S. Minot, Peony Mrs. Charles S. Minot.
" " R. & J. Farquhar & Co., display of Peonies.
" " Mt. Desert Nurseries, display of Eremuri and herbaceous flowers.
" 27. " " " display of Peonies and other herbaceous flowers.
" " R. & J. Farquhar & Co., artistic arrangement of herbaceous flowers.
July 11. " " " " " display of herbaceous flowers.
August 8. James Marlborough, culture of fancy Caladiums.
" " Mt. Desert Nurseries, display of Aconitums.
November 5. E. S. Webster, three specimen plants Begonia Mrs. Heal.
" " Peter Fisher, Carnation Alice.
" " R. & J. Farquhar & Co., display of flowering and other decorative plants.

BRONZE MEDAL.

January 10. Weld Garden, *Cymbidium Wiganianum.*

FIRST CLASS CERTIFICATE OF MERIT.

January 31. Thomas Roland, winter-flowering Sweet Peas, Christmas Pink Spencer and White Spencer.
" " H. Huebner, winter-flowering Antirrhinums.
" " Duncan Finlayson, Cymbidium hybrid (*C. eburneum* × *C. insigne*).

January 31. F. J. Dolansky, *Cattleya Trianæ* Mrs. Thos. F. Galvin.
" " M. A. Patten, Farquhar's Universal Mignonette.
" " Waban Rose Conservatories, unnamed Rose.
March 12. William Sim, new Sweet Pea Orange Orchid.
" " " " " " " Bohemian Girl.
" " " " " " " No. 4A.
" " E. B. Dane, *Cattleya intermedia alba*.
" " Wheeler & Co., *Phalaenopsis leuchorrhoda*.
April 4. R. & J. Farquhar & Co., *Spiraea Arendsii* var. *rubens*.
June 13. Jackson T. Dawson, collection of seedling climbing Roses.
" 20. Wheeler & Co., three specimens *Dendrobium formosum*, summer-flowering variety.
July 11. Mrs. J. M. Sears, collection of Delphiniums.
August 8. J. P. Rooney, Peony-Dahlia Mrs. Frederick Grinnell.
" " Mt. Desert Nurseries, Astilbe June
" " " " " " Silver White.
September 12. William Nicholson, *Buddleia variabilis* varieties.
November 28. Walter Hunnewell, Laelio-Cattleya Minna (*Cattleya Trianae* × *Laelio-Cattleya eximia*).

Cultural Certificate.

January 3. William Anderson, superior cultivation of *Buddleia asiatica*.
" 31. Martin Sullivan, " " " *Primula obconica*.
" " " " " " " " *malacoides*.
" " A. A. Pembroke, vase of Calendula Orange King.
May 16. Alexander McKay, *Calceolaria Stewartii*.
November 5. Eric H. Wetterlow, Begonia Turnford Hall.

Honorable Mention.

January 31. Knight & Struck, *Epacris paludosa*, and *Chorizema cordata splendens*.
" " R. & J. Farquhar & Co., vase. of *Buddleia asiatica*.
" " Mrs. C. G. Weld, pink Snapdragons.
March 12. R. & J. Farquhar & Co., Chinese Rhododendron, Wilson No. 1324.
" " R. & J. Farquhar & Co., display of flowering plants.
" " Thomas E. Proctor, " " " "
" " Fottler, Fiske, Rawson Co., display of Cyclamen.
" " Mrs. C. G. Weld, Antirrhinum Weld Pink.
" " William Sim, vase of Pansies.
May 16. Miss Marian Roby Case, *Anemone nemorosa*, double flowers.

June 13. C. S. Minot, display of seedling Peonies.
" " Walter Hunnewell, collection of seedling Peonies.
" " " " display of *Rhododendron delicatissimum*.
" " Mt. Desert Nurseries, display of herbaceous flowers.
" " Miss M. L. Waite, bloom of *Sarcodes sanguinea*.
June 20. Jackson T. Dawson, Rose Baby Dawson.
" " " " " collection of seedling Roses.
" " C. S. Minot, Peony R. T. Jackson.
" 27. Jackson T. Dawson, display of seedling Roses.
" " William Nicholson, display of Edelweiss.
August 8. A. M. Davenport, display of Heliotrope.
" " John Lewis Childs, new Gladiolus Whitest White.
" " " " " display of Gladioli.
" " C. W. Brown, Gladiolus Mrs. O. W. Halliday.
" " R. & J. Farquhar & Co., display of herbaceous flowers.
September 12. Thomas M. Proctor, seedling single Dahlias.
" " G. L. Stillman, collection of seedling Dahlias.
November 5. Littlefield & Wyman, seedling Carnation.
" " Ed. Winkler, " "

Vote of Thanks.

March 12. Walter Hunnewell, display of Ericas.
" " " " collection of cut Camellias.
" " R. & J. Farquhar & Co., Bay Trees and Palms.
" " " " " " " dwarf hybrid Cinerarias.
" " William Sim, vase of Sweet Peas.

Awards made at the Exhibition in honor of the Society of American Florists and Ornamental Horticulturists.

August 18, 19, and 20.

Gold Medal.

William Sim, for excellence in display of Gladioli.

Silver Medal.

B. Hammond Tracy, artistic display of Gladioli.
John Lewis Childs, display of named Gladioli.

First Class Certificate of Merit.

Jackson T. Dawson, display of Heaths and Heathers.

Cultural Certificate.

William Sim, Gladioli.

Honorable Mention.

Walter Hunnewell, display of *Buddleia variabilis magnifica*.
William Nicholson, display of Buddleia varieties.
Mt. Desert Nurseries, display of Aconitums.
Mrs. Frederick Ayer, display of Fuchsias.
E. F. Dwyer & Son, display of Dahlias.
W. D. Moon, " " "
E. B. Dane, display of Orchids.
T. C. Thurlow's Sons Co., display of Phloxes.
F. J. Rea, " " "
A. W. Preston, display of hybrid tea Roses.
Mrs. Frank Merriam, Geraniums.
Miss Isabelle H. Miller, Sweet Peas.
Faulkner Farm, collection of new Gladioli originated by Wm. Pfitser, Stuttgart.
Old Town Nurseries, display of Gladioli and herbaceous flowers.
Miss Mary Flood, display of Chinese Asters.
William Whitman, display of Chinese Asters and herbaceous flowers.
R. & J. Farquhar & Co., display of herbaceous flowers.
Eastern Nurseries, " " " "
W. W. Edgar Co., display of commercial decorative plants.
Mrs. E. M. Gill, display of cut flowers.

WILLIAM D. SLOANE ESTATE, LENOX, MASS.

REPORT OF THE COMMITTEE ON FRUITS FOR THE YEAR 1914.

By Edward B. Wilder, Chairman.

There has been a steady improvement in the exhibitions of fruit during the year and a constant increase of interest on the part of the public in them. The severe winter had disastrous effect on the peach crop, the only peaches exhibited coming from Cape Cod where the sea breezes tempered the frigid atmosphere.

The pear crop also was very poor, but the apples have been abundant, in spite of the protracted drought of the late summer and autumn, although various adverse conditions reduced the marketable crop.

The Midwinter Show had a fine amount of fruits, but the Spring Exhibition was very disappointing, only a few dishes of apples being displayed.

The Strawberry Exhibition, June 20–21, was a great advance over the one of last year, despite the fact that the date was suddenly changed making the show a week too late and thereby cutting out much fruit which could have been shown at the scheduled date.

Wilfrid Wheeler of Concord took the first prize for best collection of ten baskets of two quarts each and George V. Fletcher of Belmont first prize for best collection of six baskets, one quart each and of six varieties.

R. B. Horne of Belmont displayed a fine basket of Marshall strawberry getting first prize for best four quarts of any variety. The new strawberry St. Martin grown by Louis Graton of Randolph won the Silver Medal for the best new strawberry not yet introduced. He says "I deemed this strawberry worthy of being named for my native Parish in Canada. It has a perfect blossom and its fruit proved all that could be desired as to flavor, size of berry, and vigor of plant. The shape is very good, most of the berries are

blunt, conical, and evenly colored a rich glossy brownish red. This season it has been the most persistent bloomer and heaviest bearer but one of nine varieties."

J. H. Fletcher of Belmont, C. B. Travis of Brighton, and George V. Fletcher carried off first prizes for Red, White, and Black cherries respectively.

At the Sweet Pea Exhibition, July 11–12, there was a very fine and encouraging show of small fruits, especially of gooseberries, currants, and cherries.

Twenty-three baskets of gooseberries were displayed, Wilfrid Wheeler taking first prize for collection of six baskets of one quart each. Oliver Ames of North Easton and Dr. W. G. Kendall of Atlantic had especially fine exhibits of single dishes.

There were thirty baskets of currants, Mr. Ames and Dr. Kendall showing excellent specimens of Perfection and White Grape respectively. Charles S. Smith of Lincoln was awarded a First Class Cultural Certificate for exceptionally fine and well-grown Coe's Transparent cherries.

One of the chief features of the show, August 8–9, was the display of cultivated blueberries from the Estate of W. C. Jennison of Natick, Charles H. Chamberlain, Manager. This exhibit was entered for the Hillcrest Prizes offered by Miss Marian R. Case of Weston for the improvement of the blueberry by cultivation in Massachusetts. The committee visited the Estate of Mr. Jennison, saw the berries in cultivation, and the first prize of fifty dollars was awarded. Mr. Chamberlain writes, "Our best berry was selected with five or six other berries of different color and flavor near a swamp, brought on to our place in November, 1904, and planted in our natural soil which is a heavy loam with clay subsoil. In 1910 we renewed the loam about one foot deep and filled in with peat that had been exposed to the weather for one season and planted the berries in this with a small quantity of sand. We noticed a great improvement the first year and the result is what you saw when you visited our place."

Mr. Chamberlain also exhibited a new everbearing strawberry of good form, size, and excellent flavor, which seems to be very promising and for which he was awarded a Certificate of Merit.

Miss Cornelia Warren of Waltham, Henry Stuart, gardener,

received a gratuity of $5.00 for two fig trees in fruit and William Downs of Chestnut Hill, gardener for E. S. Webster, a First Class Cultural Certificate for very fine specimens of Lord Napier nectarines.

Early apples were also shown, L. F. Priest of Gleasondale, George V. Fletcher, H. A. Clark of Belmont, and J. H. Fletcher taking first prizes in different classes. Mrs. Elbridge Torrey of Dorchester won first prize for Clapp's Favorite pears and Frederick Mason of Taunton and Myron S. Wheeler of Berlin first prizes for plums.

There was a good display of early apples at the Dahlia and Fruit Exhibition, September 12–13. Parker Brothers of Brookfield took first prize for best collection of six varieties of Fall apples and also for collection of seasonable fruit arranged for effect with foliage. David R. Craig of Wellesley, A. F. Estabrook of Swampscott, George F. Wheeler of Concord, Parker Brothers, J. Corey & Son, Truro, taking first prizes for apples, and Dr. W. G. Kendall, A. F. Estabrook, and F. W. Dahl of Roxbury, first prizes for pears.

W. T. Hutchinson and M. S. Perkins of Danvers and Myron S. Wheeler won first prizes in plums, and Joseph S. Chase of Malden, J. Bauernfeind of Medford, Edward R. Farrar of South Lincoln, and Charles W. Libby of Medford, first prizes for grapes.

J. Corey & Son of Truro were awarded first prize for collection of peaches, first prize for Champion, and first prize for any other variety of peaches, with Greensboro, no other peaches being exhibited, when last year sixty-three dishes were on the tables. Mrs. R. Goodnough of West Roxbury was awarded a gratuity for a fine basket of fruit.

The large hall had a fine exhibit of fruit, largely apples, at the Fruit and Vegetable Show, October 3–4. Two new features were introduced by the committee this year, the first being for the largest and best exhibit of apples, not less than ten varieties, and five specimens of each, to be judged by the following scale. Number of varieties 15; value of varieties 25; cultural value 50, this to include such points as form, size, freedom from blemishes, uniformity, and quality, all such points as count in individual scores; attractiveness of exhibit 10; total 100 points.

There were four entries in this class. Alden Derby of Leominster

winning first prize, A. B. Howard & Son of Belchertown, second, and J. Corey & Son third.

The second feature was the class for best exhibit of apples in trays which were furnished by the Society, measuring 18 × 11½ inches and about 3 inches deep. Not less than five trays and one or more varieties. This arrangement gives excellent opportunity for inspection of the fruit. Alden Derby took first, Edward E. Cole, Greenbush, second, and Parker Brothers, third. These exhibits were so encouraging that the committee has entered the same classes in the Schedule for 1915.

Mrs. R. Goodnough displayed two beautiful tables of native and foreign fruits arranged for effect. Edward E. Cole carried off the first prize for best six varieties of Fall apples and Alden Derby first prize for best six dishes of Winter apples. Single dishes of apples were well represented, nearly all classes having entries, some excellent fruit being exhibited.

The display of pears was good, F. W. Dahl of Roxbury won first prize for best collection, also four first prizes for individual dishes of pears. A. B. Howard & Son also took four first prizes in this latter class.

Grapes were in abundance, there being quite a number of entries for the best collection of not less than six varieties, J. Bauernfeind having the best. Charles W. Libby won five first prizes for single dishes of grapes, Dr. Kendall three, Edward R. Farrar and J. Bauernfeind two.

J. Corey & Son were the only exhibitors of peaches, showing Champion, Elberta, and Late Crawford. David R. Craig had the best dish of quinces, showing some good Orange quince.

The number of exhibits and quality of fruit at the Chrysanthemum Show, November 5–8, excelled anything your committee has ever seen at this exhibition and created full as much interest as the plants and flowers. There were 149 dishes of fruit on the tables and with the exception of a few dishes of apples which showed San José scale the specimens were good.

E. M. Bruce of Leominster won first prize for best collection of apples arranged for decorative effect, having a table of very fine native apples, and Edward MacMulkin of Boston took first prize for a beautiful collection of native and foreign fruit also arranged for effect.

We were surprised to find six entries for best six varieties of Winter apples, with some excellent fruit displayed. Edward E. Cole won first, E. F. Adams, second, and Parker Brothers, third prize in this class. F. W. Dahl won first prize for best collection of six varieties of Winter pears.

John Bauernfeind, Charles W. Libby, and Dr. W. G. Kendall won first, second, and third prizes respectively for collection of hardy native grapes, not less than three varieties.

EDWARD B. WILDER
WILLIAM DOWNS
HAROLD L. FROST
} *Committee on Fruits.*

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1914.

MIDWINTER FLOWER SHOW.

JANUARY 31, AND FEBRUARY 1.

WINTER APPLES.— Collection of four varieties:
1st, C. M Parker, $6; 2d, Elliott & H. W. Moore, $4.
Two dishes, two varieties:
2d, G. V. Fletcher, $3; 2d, Elliott & H. W. Moore, $2.
Dish of one variety:
1st, G. V. Fletcher, Rhode Island Greening, $3; 2d, G. V. Fletcher, Baldwin, $2; 3d, Elliott & H. W. Moore, King, $1.
WINTER PEARS.— Collection of four varieties:
1st, F. W. Dahl, $5; 2d, G. V. Fletcher, $4.
Dish of one variety:
1st, Dr. W. G. Kendall, Bosc, $3; 2d, G. V. Fletcher, Bosc, $2; 3d, Dr. W. G. Kendall, Dana's Hovey, $1.

SPRING EXHIBITION.

MARCH 12, 13, 14, AND 15.

WINTER APPLES.— Collection of four varieties:
1st, G. V. Fletcher, $6.

Two dishes, two varieties:
1st, Parker Bros., $4.
Dish of one variety:
1st, Mrs. E. F. Kendall, $3.

Peony Exhibition.

June 20 and 21.

Gratuities:—

Wilfrid Wheeler, five baskets of Strawberries, $4.
" " Gov. Wood Cherries, $1.
C. B. Travis, Elton Cherries, $1.
" " " Black Eagle Cherries, $1.

Rose and Strawberry Exhibition.

June 27 and 28.

John A. Lowell Fund.

Strawberries.— For the best collection of ten baskets of two quarts each, not less than six varieties:
1st, Wilfrid Wheeler, $25; 2d, G. V. Fletcher, $15; 3d, G. V. Wheeler, $10.
Six baskets of one quart each, six varieties:
1st, G. V. Fletcher, $5; 2d, G. F. Wheeler, $4.

Benjamin H. Pierce Fund.

Two quarts of any variety introduced since 1910:
2d, G. F. Wheeler, $3.
For the best four quarts of any variety:
1st, R. B. Horne, Marshall, $8; 2d, G. V. Fletcher, Barrymore, $6; 3d, Samuel McMullin, Brewer, $4.
For the best single plate of any variety arranged with foliage, twenty-four specimens:
1st, E. S. Webster, $3; 2d, Samuel McMullin, $2.
For the best new strawberry not yet introduced:
Louis Graton, St. Martin, Silver Medal.
Two quarts of Abington:
1st, R. B. Horne, $3.

Two quarts of Barrymore:
1st, G. V. Fletcher, $3; 2d, G. F. Wheeler, $2.
Two quarts of Black Beauty:
1st, G. F. Wheeler, $3.
Two quarts of Glen Mary:
1st, G. F. Wheeler, $3.
Two quarts of Golden Gate:
1st, Mrs. J. M. Forbes, $3; 2d, W. C. Cooper, $2; 3d, G. V. Fletcher, $1.
Two quarts of Marshall:
1st, E. S. Webster, $3; 2d, R. B. Horne, $2; 3d, G. V. Fletcher, $1.
Two quarts of Minute Man:
1st, G. F. Wheeler, $3.
Two quarts of any other variety:
1st, Louis Graton, Chesapeake, $5; 2d, Louis Graton, Brandywine, $3; 3d, W. C. Cooper, Bubach, $2.

CHERRIES.— Two quarts of any red variety:
1st, J. H. Fletcher, Royal Ann, $3; 2d, Mrs. M. P. Ruker, Royal Ann, $2; 3d, Mrs. M. W. Chadbourne, Downer, $1.
Two quarts of any black variety:
1st, G. V. Fletcher, Black Tartarian, $3; 2d, C. B. Travis, Black Tartarian, $2.
Two quarts of any white or yellow variety:
1st, C. B. Travis, $3; 2d, Michael Cahalan, $2.

Gratuity:—

Wilfrid Wheeler, display of Strawberries, $4.

SWEET PEA EXHIBITION.

JULY 11 AND 12.

Benjamin V. French Fund No. 2.

RASPBERRIES.— Two quarts of any red variety:
1st, Louis Graton, Geneva, $3.

CHERRIES.— Two quarts of any variety:
1st, G. V. Fletcher, Black Tartarian, $3; 2d, Mrs. M. J. Merrill, Royal Ann, $2; 3d, C. S. Smith, Coe's Transparent, $1.

Theodore Lyman Fund No. 1.

CURRANTS.— Two quarts of Fay's:
1st, Samuel McMullin, $3; 2d, Oliver Ames, $2; 3d, William Whitman, $1.

Two quarts of Perfection:
1st, Oliver Ames, $3; 2d, William Whitman, $2.
Two quarts of Wilder:
1st, Dr. W. G. Kendall, $3; 2d, G. V. Fletcher, $2.
Two quarts of any other red variety:
1st, T. D. Hatfield, $3; 2d, G. V. Fletcher, $2; 3d, William Whitman, $1.
Two quarts of any white variety:
1st, Dr. W. G. Kendall, $3; 2d, Oliver Ames, $2; 3d, William Whitman, $1.
Collection of six baskets, one quart each, not less than four varieties:
1st, William Whitman, $5.

Society's Prizes.

Gooseberries.— Collection of six baskets, one quart each, not less than four varieties:
1st, Wilfrid Wheeler, $5.
Two quarts of Columbus:
1st, Oliver Ames, $3; 2d, Dr. W. G. Kendall, $2; 3d, Mrs. A. A. Warburton, $1.
Two quarts of Downing:
1st, Oliver Ames, $3; 2d, Dr. W. G. Kendall, $2; 3d, Wilfrid Wheeler, $1.
Two quarts of Industry:
1st, Dr. W. G. Kendall, $3; 2d, Oliver Ames, $2; 3d, J. Bauernfeind, $1.
Two quarts of Triumph:
1st, J. Bauernfeind, $3.
Two quarts of any other variety:
1st, Dr. W. G. Kendall, Bates, $3; 2d, J. Bauernfeind, Chautauqua, $2; 3d, Mrs. R. Goodnough, Chautauqua, $1.
Collection of Fruit.— Largest and best collection of midsummer fruits, arranged for effect with their own foliage:
1st, Wilfrid Wheeler, $8; 2d, G. V. Fletcher, $6.

Gratuities:—

T. D. Hatfield, Black Currants, $1.
I. I. Margeson, Currants and Gooseberries, $1.
William Whitman, collection of Currants, $1.
C. S. Smith, Coe's Transparent Cherry, Cultural Certificate.

Gladiolus and Phlox Exhibition.

August 8 and 9.

Apples.— Oldenburg:
1st, L. F. Priest, $3.
Red Astrachan:
1st, L. F. Priest, $3; 2d, M. S. Wheeler, $2.
Sweet Bough:
1st, G. V. Fletcher, $3; 2d, Parker Bros. $2.
Yellow Transparent:
1st, H. A. Clark, $3; 2d, E. S. Webster, $2; 3d, L. F. Priest, $1.
Williams:
1st, J. H. Fletcher, $3; 2d, W. Heustis & Son, $2; 3d, M. S. Wheeler, $1.
Pears.— Clapp's Favorite:
1st, Mrs. Elbridge Torrey, $3; 2d, F. W. Dahl, $2; 3d, Col. Frederick Mason, $1.
Any other variety:
1st, W. Heustis & Son, Beurre Giffard, $3; 2d, F. W. Dahl, Dearborn Seedling, $2; 3d, G. V. Fletcher, Boussock, $1.
Plums, Japanese.— Abundance:
1st, Col. Frederick Mason, $3; 2d, M. S. Wheeler, $2.
Burbank:
1st, Col. Frederick Mason, $3; 2d, W. T. Hutchinson, $2; 3d, M. S. Wheeler, $1.
Any other variety:
1st, M. S. Wheeler, $3; 2d, Col. Frederick Mason, $2; 3d, W. T. Hutchinson, $1.

Society's Prizes.

Nectarines.— Six specimens of one variety:
1st, E. S. Webster, Lord Napier, $5.

Miss Marian R. Case Prize for Cultivated Blueberries.

Estate of W. C. Jennison (C. H. Chamberlain, Supt.), $50.

Gratuities:—

Miss Cornelia Warren, two Fig trees, $5.
Mrs. R. Goodnough, basket of Late Duke Cherries, $3.
William Downs, Lord Napier Nectarines, First Class Certificate of Merit.
Estate of W. C. Jennison, Everbearing Strawberry, First Class Certificate of Merit.

Dahlia and Fruit Exhibition.

September 12 and 13.

Special Prizes.

Theodore Lyman Fund No. 1.

Apples.— For the best collection of six varieties of Fall Apples, twelve of each:
1st, Parker Bros., $10.

Benjamin V. French Fund No. 1.

Peaches.— For the largest and best collection of native peaches:
1st, J. Corey & Son, $10.

Marshall P. Wilder Fund.

Pears.— Bartlett:
1st, Dr. W. G. Kendall, $3; 2d, Mrs. Elbridge Torrey, $2; 3d, E. S. Martin, $1.
Clapp's Favorite:
1st, A. F. Estabrook, $3.
Any other variety:
1st, F. W. Dahl, Tyson, $3; 2d, E. B. Wilder, President, $2; 3d, J. Bauernfeind, Flemish Beauty, $1.

Society's Prizes.

Apples.— Gravenstein:
1st, D. R. Craig, $3; 2d, E. E. Cole, $2; 3d, G. V. Fletcher, $1.
Maiden Blush:
1st, A. F. Estabrook, $3; 2d, E. E. Cole, $2.
Porter:
1st, G. F. Wheeler, $3; 2d, Parker Bros., $2; 3d, D. R. Craig, $1.
Wealthy:
1st, Parker Bros., $3.
Any other variety:
1st, J. Corey & Son, Duchess, $3; 2d, G. V. Fletcher, Williams, $2; 3d, M. S. Wheeler, Red Astrachan, $1.
Melons.— Mrs. H. H. Rogers, three specimens:
1st, Wilfrid Wheeler, $3.

Any other variety, three specimens:
1st, A. W. Preston, Superlative, $3.

PEACHES.— Champion:
1st, J. Corey & Son, $3.
Any other variety:
1st, J. Corey & Son, Greensboro, $3.

PLUMS.— Collection of not less than four varieties other than Japanese, twelve specimens of each:
1st, W. T. Hutchinson, $5; 2d, G. V. Fletcher, $3.
Single plate of any variety other than Japanese:
1st, M. S. Perkins, Bradshaw, $3; 2d, G. V. Fletcher, Bradshaw, $2; 3d, M. S. Perkins, Yellow Egg, $1.

JAPANESE PLUMS.— Collection of not less than four varieties, twelve specimens of each:
1st, M. S. Wheeler, $5.
Single plate of any variety:
1st, M. S. Wheeler, Hale, $3; 2d, Mrs. R. Goodnough, Burbank, $2.

Marshall P. Wilder Fund.

NATIVE GRAPES.— Green mountain, six bunches:
1st, J. S. Chase, $3; 2d, E. R. Farrar, $2; 3d, Dr. W. G. Kendall, $1.
Any other white grape, six bunches:
1st, J. Bauernfeind, Niagara, $3; 2d, D. R. Craig, Niagara, $2; 3d, C. W. Libby, Moore's Diamond, $1.
Moore's Early, six bunches:
1st, E. R. Farrar, $3; 2d, C. W. Libby, $2.
Any other purple grape, six bunches:
1st, E. R Farrar, Worden, $3; 2d, J. S. Chase, Nectar, $2; 3d, G. W. Jameson, Clinton, $1.
Any red grape, six bunches:
1st, C. W. Libby, Lucile, $3; 2d, J. S. Chase, Delaware, $2; 3d, E. R. Farrar, Brighton, $1.
Collection of five varieties, three bunches of each:
1st, J. Bauernfeind, $5; 2d, E. R. Farrar, $4; 3d, C. W. Libby, $3.

Society's Prizes.

COLLECTION OF FRUIT.— Collection of seasonable fruit arranged for effect with foliage, to cover a space not larger than twenty-four square feet:
1st, Parker Bros., $15; 2d, G. V. Fletcher, $12.

Gratuities:—

A. F. Estabrook, Pears, $1.
E. R. Farrar, collection of Grapes, $3.
Mrs. R. Goodnough, basket of fruit, $5.

Fruit and Vegetable Exhibition.

October 3 and 4.

Theodore Lyman Fund No. 1.

Apples.— Collection of six varieties of fall apples, ripe, twelve of each: 1st, E. E. Cole, $12; 2d, Alden Derby, $10; 3d, A. B. Howard & Son, $8.

Samuel Appleton Fund.

Apples.— Baldwin:
1st, A. B. Howard & Son, $3; 2d, E. E. Cole, $2; 3d, Parker Bros., $1.
Hubbardston:
1st, E. E. Cole, $3; 2d, D. R. Craig, $2; 3d, Charles Scully, $1.

Benjamin V. French Fund No. 2.

Apples.— Gravenstein:
1st, Alden Derby, $3; 2d, E. E. Cole, $2; 3d, G. V. Fletcher, $1.
King:
1st, E. E. Cole, $3; 2d, Parker Bros., $2; 3d, M. J. Cain, $1.
McIntosh:
1st, Alden Derby, $3; 2d, E. E. Cole, $2; 3d, E. R. Farrar, $1.

Josiah Bradlee Fund.

Apples.— Northern Spy:
1st, E. E. Cole, $3; 2d, Edward Warren, $2; 3d, Parker Bros., $1.

Society's Prizes.

Apples.— Bellflower:
1st, Parker Bros., $3; 2d, D. R. Craig, $2.
Blenheim:
1st, J. Corey & Son, $3.
Fall Pippin:
2d, W. C. Winter, $2.
Fameuse:
1st, E. E. Cole, $3; 2d, A. B. Howard & Son, $2; 3d, G. V. Fletcher, $1.
Golden Russet:
1st, H. A. Lamb, $3; 2d, E. E. Cole, $2.

Gravenstein:
1st, E. E. Cole, $3; 2d, J. Corey & Son, $2; 3d, Alden Derby, $1.
Jonathan:
1st, Alden Derby, $3; 2d, F. H. Evans, $2.
Maiden Blush:
1st, E. E. Cole, $3; 2d, A. F. Estabrook, $2.
Palmer Greening:
1st, Alden Derby, $3.
Pound Sweet:
1st, G. V. Fletcher, $3.
Rhode Island Greening:
1st, Alden Derby, $3; 2d, A. B. Howard & Son, $2; 3d, E. E. Cole, $1.
Roxbury Russet:
1st, Alden Derby, $3; 2d, Parker Bros., $2; 3d, J. Corey & Son, $1.
Sutton:
1st, A. B. Howard & Son, $3; 2d, Alden Derby, $2; 3d, G. V. Fletcher, $1.
Tolman Sweet:
1st, E. E. Cole, $3; 2d, G. V. Fletcher, $2.
Twenty Ounce:
1st, Mrs. N. P. Cutler, $3; 2d, J. Corey & Son, $2.
Wagener:
2d, J. W. Barton, $2; 3d, Edward Warren, $1.
Any other variety, ripe:
1st, T. L. Perkins, Porter, $3; 2d, E. E. Cole, Bietigheimer, $2; 3d, Edward Warren, Pumpkin Russet, $1.
Any other variety, not ripe:
1st, A. B. Howard & Son, Canada Red, $3; 2d, E. E. Cole, Ben Davis, $2, 3d, Edward Warren, Lyscom, $1.
For the largest and best collection of apples, not less than ten varieties, five specimens of each:
1st, Alden Derby, $15; 2d, A. B. Howard & Son, $12; 3d, J. Corey & Son, $10.
For the best exhibit of apples in trays:
1st, Alden Derby, $25; 2d, E. E. Cole, $15; 3d, Parker Bros., $10.
For the best six varieties of winter apples, twelve specimens of each:
1st, Alden Derby, $12; 2d, E. E. Cole, $10; 3d, Parker Bros., $8.
Crabapples.— Twenty-four specimens, any variety:
1st, C. A. Moore, $3; 2d, Alden Derby, $2; 3d, E. E. Cole, $1.

Benjamin V. French Fund No. 2.

Pears.— Angouleme:
1st, F. W. Dahl, $3; 2d, Mrs. Elbridge Torrey, $2.
Belle Lucrative:
2d, W. C. Winter, $2.

Bosc:
1st, Dr. W. G. Kendall, $3; 2d, A. B. Howard & Son, $2; 3d, W. Heustis & Son, $1.
Clairgeau:
1st, A. B. Howard & Son, $3; 2d, E. L. Smith, $2; 3d, W. Heustis & Son, $1.
Comice:
3d, J. L. Bird, $1.
Dana's Hovey:
1st, Dr. W. G. Kendall, $3; 2d, A. B. Howard & Son, $2; 3d, G. V. Fletcher, $1.
Lawrence:
1st, F. W. Dahl, $3; 2d, H. A. Lamb, $2; 3d, J. L. Bird, $1.
Louise Bonne de Jersey:
1st, A. B. Howard & Son, $3; 2d, F. W. Dahl, $2.
Marie Louise:
1st, Mrs. Elbridge Torrey, $3.
Onondaga:
1st, H. A. Lamb, $3; 2d, C. B. Travis, $2.
Seckel:
1st, F. W. Dahl, $3; 2d, A. B. Howard & Son, $2; 2d, A. F. Estabrook, $1.
Sheldon:
1st, Mrs. R. Goodnough, $3; 2d, F. W. Dahl, $2; 3d, C. A. Moore, $1.
Urbaniste:
1st, F. W. Dahl, $3; 2d, J. L. Bird, $2; 3d, E. B. Wilder, $1.
Vicar:
1st, E. B. Wilder, $3; 2d, F. W. Dahl, $2; 3d, H. A. Lamb, $1.
Winter Nelis:
1st, A. B. Howard & Son, $3.
Worden Seckel
1st, A. B. Howard & Son, $3; 2d, J. S. Chase, $2.
Any other variety:
1st, A. B. Howard & Son, Bartlett, $3; 2d, F. H. Evans, Flemish Beauty, $2; 3d, A. B. Howard & Son, Flemish Beauty, $1.
Collection of pears, not more than twelve plates of twelve specimens each and not less than six varieties:
1st, F. W. Dahl, $10; 2d, G. V. Fletcher, $8; 3d, A. B. Howard & Son, $6.

Marshall P. Wilder Fund.

PEARS.— Anjou:
1st, F. W. Dahl, $3; 2d, A. F. Estabrook, $2; 3d, J. Bauernfeind, $1.
GRAPES.— Concord, twelve bunches:
1st, E. R. Farrar, $4.
Niagara:
1st, J. Bauernfeind, $4.

Worden:
1st, E. R. Farrar, $4.

Society's Prizes.

NATIVE GRAPES.— Agawam, six bunches:
1st, Dr. W. G. Kendall, $3; 2d, C. W. Libby, $2.
Brighton:
1st, C. W. Libby, $3; 2d, J. Bauernfeind, $2; 3d, Oliver Ames, $1.
Campbell's Early:
1st, J. Bauernfeind, $3; 2d, Dr. W. G. Kendall, $2.
Delaware:
1st, Col. Frederick Mason, $3; 2d, C. W. Libby, $2; 3d, E. R. Farrar, $1.
Eaton:
1st, Mrs. R. Goodnough, $3; 2d, Col. Frederick Mason, $2.
Green Mountain:
2d, Oliver Ames, $2.
Herbert:
1st, C. W. Libby, $3; 2d, J. Bauernfeind, $2.
Isabella:
1st, C. W. Libby, $3; 2d, Dr. W. G. Kendall, $2.
Lindley:
1st, C. W. Libby, $3.
Moore's Diamond:
1st, Charles Sander, $3; 2d, C. W. Libby, $2; 3d, Mrs. R. Goodnough, $1.
Salem:
1st, Dr. W. G. Kendall, $3; 2d, J. Bauernfeind, $2.
Vergennes:
1st, Dr. W. G. Kendall, $3; 2d, E. S. Martin, $2.
Wilder:
1st, E. A. Adams, $3.
Any other variety:
1st, C. W. Libby, Pocklington. $3; 2d, J. Bauernfeind, Diana, $2; 3d, J. S. Chase, Diana, $1.
Collection of hardy native grapes, not less than six varieties, three bunches each:
1st, J. Bauernfeind, $10; 2d, C. W. Libby, $8; 3d, Col. Frederick Mason, $1.
PEACHES.— Champion:
1st, J. Corey & Son, $3.
Any other variety:
1st, J. Corey & Son, Late Crawford, $3; 2d, J. Corey & Son, Elberta, $2.

PLUMS.— Any variety:
1st, M. S. Wheeler, Wickson, $3; 2d, M. S. Wheeler, Lombard, $2; 3d, A. B. Howard & Son, Monarch, $1.

QUINCES.— Any variety:
1st, D. R. Craig, Orange, $3; 2d, G. V. Fletcher, Orange, $2; 3d, G. G. Barker, $1.

NATIVE NUTS.— Collection of not less than four varieties, one quart of each:
1st, M. S. Wheeler, $4; 2d, Mrs. F. C. Upham, $3.

COLLECTION OF FRUIT.— Collection of native and foreign fruits, arranged for effect:
1st, Mrs. R. Goodnough, $15 and Silver Medal.

Gratuities:—

Mrs. N. P. Cutler, Wellwood canteloupe, $2.
Edward Gowing, Rocky Ford Melons, $2.
C. W. Rowley, Watermelon, $2.
W. C. Jennison Estate, Strawberries, $1.
L. S. Richards, Baldwin and McIntosh Apples grown on dwarf trees, $1.
Mrs. R. Goodnough, display of fruit, $10.

CHRYSANTHEMUM SHOW.

NOVEMBER 5, 6, 7, AND 8.

Samuel Appleton Fund.

APPLES.— Baldwin:
1st, E. E. Cole, $3; 2d, E. F. Adams, $2; 3d, Parker Bros., $1.
Hubbardston:
1st, G. V. Fletcher, $3; 2d, Parker Bros., $2; 3d, C. A. Campbell, $1.

Benjamin V. French Fund No. 1.

APPLES.— Rhode Island Greening:
1st, E. F. Adams, $3; 2d, E. E. Cole, $2.

Society's Prizes.

APPLES.— Bellflower:
1st, W. H. Stone, $3; 2d, Parker Bros., $2; 3d, Mrs. E. F. Kendall, $1.
McIntosh:
1st, E. F. Adams, $3; 2d, E. M. Bruce, $2; 3d, M. S. Wheeler, $1.

Northern Spy:
1st, E. E. Cole, $3; 2d, Parker Bros., $2; 3d, G. V. Fletcher, $1.
Palmer Greening:
1st, E. F. Adams, $3.
Pound Sweet:
3d, G. V. Fletcher, $1.
Roxbury Russet:
1st, H. C. Fuller, $3; 2d, M. S. Wheeler, $2; 3d, Parker Bros., $1.
Sutton:
1st, G. V. Fletcher, $3.
Tolman Sweet:
1st, Mrs. E. F. Kendall, $3; 2d, E. N. Powers, $2; 3d, F. E. Kendall, $1.
Tompkins County King:
1st, Parker Bros., $3.
Wagener:
1st, C. A. Campbell, $3.
Winter Banana:
1st, F. E. Kendall, $3.
Any other variety:
1st, C. A. Campbell, Banks' Gravenstein, $3; 2d, Parker Bros., Fallawater, $2; 3d, C. A. Campbell, Jonathan, $1.
For the best six varieties of winter apples, twelve specimens of each:
1st, E. E. Cole, $10; 2d, E. F. Adams, $8; 3d, Parker Bros., $6.
Collection of apples arranged for decorative effect:
1st, E. M. Bruce, $20; 2d, Parker Bros., $15.

NATIVE GRAPES.— Collection of hardy native grapes, not less than three varieties, three bunches of each:
1st, John Bauernfeind, $6; 2d, C. W. Libby, $4; 3d, Dr. W. G. Kendall, $3.

QUINCES.— Any variety, twelve specimens:
1st, G. V. Fletcher, Orange, $3; 2d, G. V. Fletcher, Champion, $2; 3d, E. M. Bruce, Champion, $1.

COLLECTION.— Native and foreign fruit, arranged for effect:
1st, Edward MacMulkin, $15, and Silver Medal.

John S. Farlow

Newton Horticultural Society Fund.

PEARS.— Angouleme:
1st, Mrs. Elbridge Torrey, $3; 2d, F. W. Dahl, $2.
Dana's Hovey:
1st, Dr. W. G. Kendall, $3; 2d, G. V. Fletcher, $2; 3d, J. S. Chase, $1.

Lawrence:
1st, F. W. Dahl, $3; 2d, H. A. Lamb, $2; 3d, John Bauernfeind, $1.
Seckel:
1st, John Bauernfeind, $3; 2d, G. V. Fletcher, $2; 3d, F. W. Dahl, $1.
Vicar:
1st, F. W. Dahl, $3.
Winter Nelis:
1st, J. L. Bird, $3.
Any other variety:
1st, F. W. Dahl, Urbaniste, $3; 2d, F. W. Dahl, Sieulle, $2; 3d, W. C. Winter, Diel, $1.
Collection of six varieties of winter pears, twelve specimens of each: 1st, F. W. Dahl, $10; 2d, G. V. Fletcher, $8.

Samuel Appleton Fund.

PEARS.— Bosc:
1st, Dr. W. G. Kendall, $3; 2d, G. V. Fletcher, $2; 3d, John Bauernfeind, $1.
Sheldon:
1st, G. V. Fletcher, $3; 2d, John Bauernfeind, $2; 3d, C. B. Travis, $1.

Marshall P. Wilder Fund.

PEARS.— Anjou:
1st, F. W. Dahl, $3; 2d, John Bauernfeind, $2.

VIEW ON THE ESTATE OF GIRAUD FOSTER, LENOX, MASS.

REPORT OF THE COMMITTEE ON VEGETABLES FOR THE YEAR 1914.

By Duncan Finlayson, Chairman.

There were nine regular exhibitions during the year at which vegetables were shown, and your committee is glad to report a decided improvement in the various exhibits during the year, both in arrangement and in quality. We note with pleasure the interest of, and the splendid exhibits made by, the Boston Market Gardeners' Association during the year.

The March 12–15 Show was in every way up to former years and the various classes were well contested. The Boston Market Gardeners' Association made a remarkable display of vegetables in boxes at this exhibition. Among them we note the following: 31 boxes of lettuce, 5 boxes of cucumbers, 4 boxes of carrots, 2 boxes of turnips, 4 boxes of parsnips, 6 boxes of radishes, 4 boxes of watercress, 5 boxes of dandelions, 5 boxes of beets, 3 boxes of spearmint, 3 boxes of parsley, 2 boxes of endive, 3 boxes of leeks, 3 boxes of potatoes, 6 hubbard squashes, with other smaller exhibits, all of which were splendidly arranged.

At the May 16 Show the asparagus from Mr. Frank Wheeler, Concord, Mass., was of remarkable quality and was awarded a Cultural Certificate. The variety was Early Giant Argenteuil. Some very fine tomatoes were exhibited by the Faulkner Farm, W. N. Craig, gardener, and were awarded the first and second premiums. Thomas Watt, superintendent at Wellesley College, exhibited a new salad plant, Udo, for which a Vote of Thanks was awarded. This new plant was introduced from Japan by the United States Department of Agriculture, and is highly recommended as an addition to our spring esculents.

June 27–28, Rose and Strawberry Show. All the classes were well contested, and the quality of the vegetables was excellent. Col. Frederick Mason of Taunton was awarded first premium for a

collection of vegetables, ten varieties, tastefully arranged. The individual exhibits were of high order.

July 11. The Boston Market Gardeners' Association made a splendid showing at this exhibition. The cauliflower from W. H. Allen, Arlington, was of superior quality. Walter J. Clemson, Taunton, was awarded first premium for a collection of vegetables, twelve varieties, tastefully arranged.

August 8. Norris F. Comley, Lexington, showed several new seedling cucumbers, some of them very promising. We noted splendid onions from Oliver Ames, North Easton, and Golden Dawn sweet corn from A. M. Davenport, Watertown; also a collection of potatoes of splendid quality from the Jordan Farm, not for competition. Oliver Ames, North Easton, was awarded first premium for the collection of vegetables, fifteen varieties, decoration and arrangement to be considered. The collection was well worthy of the prize. It was splendidly arranged.

The October Exhibition was the main show of the season, and the display of the various vegetables at this show was of high order. Several new varieties were shown which we hope will be tried another year. The collection of potatoes from E. L. Lewis, Taunton, was excellent. The following named varieties were noted among them: Early Rose, Early Ohio, Long Stone, Noroton Beauty, New Queen, Carman, Bliss's Triumph, Dewdrop, Prolific Early, Early Surprise, Green Mountain, Norcross, Early Harvest, Northern Beauty, White Bliss, Seneca Beauty, Clark's Pride, Clark's No. 1, Sir Walter Raleigh, Golden Crown. This collection received first premium for largest and best collection of potatoes.

David L. Fiske, Grafton, exhibited a new potato named Sutton's Congo, black in color, rather long and deep eyes. We hope it will make a better showing next year. A Vote of Thanks was awarded for this variety.

Class 594, Levi Whitcomb Fund, Best seedling potato not in commerce, grown for at least two years in New England, 24 specimens: brought out several competitors, but your committee did not award the prize, for none of the exhibits were up to the standard of the older varieties now in commerce. S. Wilson, of Weston, Mass., showed three seedling potatoes named Sherwood, Delki,

and Morning Glory. Awarded Vote of Thanks. David R. Craig of Wellesley, a new exhibitor, showed some excellent vegetables at the various shows; also F. W. Sargent of Wellesley.

Class 539, Collection of vegetables, twelve kinds, not more than one variety of a kind, tastefully arranged: first premium was awarded to Oliver Ames, North Easton, second to Col. Frederick Mason, Taunton. The two exhibits were very even and it took the committee some time to decide as to who should receive the first premium. They were both beautifully arranged and the quality of each exhibit was excellent.

In Class 596 A, Best display of vegetables put up in glass jars: the first premium was awarded to Mrs. G. B. Gill of Medford. The following twenty-five varieties were noted among them: Corn on cob and off, lima beans, tomatoes, onions, chard, egg plants, cabbage, beets, asparagus, salsify, summer squash, Brussels sprouts, kohl-rabi, peas, cauliflower, carrot, mushrooms, sweet pepper, rhubarb, tomatoes with mushrooms. The second prize was awarded to Mrs. F. C. Upham, Melrose, Mass. We believe that by encouraging the industry of putting up vegetables at the proper time we would help the vegetable grower and help to solve the problem of the high cost of living.

Class 595, For the best new vegetable shown in the year 1914, a Silver Medal: your committee did not award this medal for they thought there was nothing shown in this class worthy of the award.

Class 596, For the best improved vegetable shown in the year 1914, a Silver Medal: this medal was awarded to J. B. Shurtleff, Jr., Revere, Mass., for a hybrid squash, a cross between Marrow and the hard shelled Red Hubbard. The quality was excellent and the keeping quality vouched for by the raiser. In speaking of this variety Mr. Shurtleff said the squash had been in the family for over fifty years, and ten years ago he commenced to mix with it the hard shell Red Hubbard to improve the keeping quality as well as to make it heavier and of better flavor. It is now a fixed type. It is a splendid cropper. He grew twenty tons of it last year and intends to double it next year.

Class 679, Collection of vegetables exhibited by seedsmen, a Silver Medal: this prize was awarded to the T. J. Grey Company, South Market St., Boston, for a collection of eighty-nine varieties

of vegetables, all correctly labelled. It was one of the most comprehensive collections of vegetables ever staged at Horticultural Hall, and great credit is due the T. J. Grey Co. for the artistic and educational way they were displayed. We sincerely hope that more seedsmen will compete in this class another year.

We congratulate the Society on the splendid showing in the vegetable department made the past year. We hope the Society will continue to give liberal prizes, as experience proves that the large prizes bring out the best competition.

A detailed list of awards made during the year is appended to this report.

DUNCAN FINLAYSON, WILLIAM N. CRAIG, HENRY M. HOWARD } *Committee on Vegetables.*

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1914.

SPRING EXHIBITION.

MARCH 12, 13, 14, AND 15.

BEANS.— String, fifty pods:
1st, E. D. Jordan, $3.

LETTUCE.— Four heads:
1st, G. D. Moore, $3; 2d, J. W. Stone, $2.

RADISHES.— Four bunches of twelve:
1st, J. W. Stone, $3; 2d, Esty Bros., $2.

TOMATOES.— Twelve specimens:
1st, A. W. Preston, $3.

Gratuities:—

Frank Wheeler, Rhubarb, $3.
Boston Market Gardeners' Association, collection of vegetables, $75.
Mrs. M. W. Chadbourne, " " " $1.

May Exhibition.

May 16 and 17.

Theodore Lyman Fund No. 2.

Asparagus.— Four bunches, twelve stalks each:
1st, Wilfrid Wheeler, $5; 2d, Frank Wheeler, $3; 3d, Oliver Ames, $2.
Cucumbers.— Four:
1st, J. W. Stone, $3; 2d, W. H. Allen, $2; 3d, A. F. Coolidge, $1.
Lettuce.— Four heads:
1st, Oliver Ames, $3; 2d, Wyman Bros., $2; 3d, F. E. Coolidge, $1.
Radishes.— Four bunches:
1st, J. W. Stone, $3; 2d, J. W. Stone, $2; 3d, Wyman Bros., $1.
Tomatoes.— Twelve specimens:
1st, Faulkner Farm, $3; 2d, Faulkner Farm, $2; 3d, Mrs. J. L. Gardner, $1.

Gratuities:—

William Whitman, Parsley, $1.
Oliver Ames, Rhubarb, $1.
Wyman Bros., collection of Lettuce, $1.
Boston Market Gardeners' Association, collection of vegetables in boxes, $30.
W. H. Allen, collection of vegetables, $1.
T. T. Watt, Udo, Japanese salad plant, Vote of Thanks.
Mrs. M. W. Chadbourne, collection of vegetables, Vote of Thanks.

Rhododendron Exhibition.

June 13 and 14.

Theodore Lyman Fund No. 2.

Asparagus.— Four bunches, twelve stalks each:
1st, Frank Wheeler, $5; 2d, Frank Wheeler, $3.
Beans.— String variety, one quart, forced:
1st, Mrs. Frederick Ayer, $3.
Beets.— Twelve specimens:
1st, F. W. Sargent, $3.

CABBAGES.— Four specimens:
1st, W. Heustis & Son, $3; 2d, W. Heustis & Son, $2.
CAULIFLOWERS.— Four specimens:
3d, Mrs. A. A. Warburton, $2.
CARROTS.— Four bunches:
1st, W. Heustis & Son, $3.
CUCUMBERS.— Four:
1st, M. E. Moore, $3; 2d, M. E. Moore, $2.
LETTUCE.— Four heads:
1st, W. Heustis & Son, $3; 2d, W. Heustis & Son, $2; 3d, M. E. Moore, $1.
RADISHES.— Four bunches:
1st, W. Heustis & Son, $3; 2d, Mrs. A. A. Warburton, $2.
ANY OTHER VEGETABLE not mentioned in the above:
1st, Mrs. A. A. Warburton, Peas, $3; 2d, F. W. Sargent, New Zealand Spinach, $2; 3d, Mrs. A. A. Warburton, Peas, $1.
COLLECTION OF VEGETABLES.— Grown in 1914, eight varieties:
1st, F. W. Sargent, $8; 2d, W. Heustis & Son, $5.

Gratuity:—

Frank Wheeler, Asparagus, First Class Certificate of Merit.

ROSE AND STRAWBERRY EXHIBITION.

JUNE 27 AND 28.

Theodore Lyman Fund No. 2.

BEETS.— Twelve, open culture:
1st, Col. Frederick Mason, $3; 2d, M. E. Moore, $2; 3d, D. L. Fiske, $1.
CABBAGES.— Four specimens:
1st, M. E. Moore, $3; 2d, W. Heustis & Son, $2; 3d, W. Heustis & Son, $1.
CAULIFLOWERS.— Four specimens:
3d, W. J. Clemson, $2.
CUCUMBERS.— Four specimens:
1st, M. E. Moore, $3; 2d, W. J. Clemson, $2.
LETTUCE.— Four heads:
1st, W. J. Clemson, $4; 2d, M. E. Moore, $3; 3d, F. W. Sargent, $2; 4th, Col. Frederick Mason, $1.
PEAS.— Gradus or Thomas Laxton, fifty pods:
1st, W. J. Clemson, $3; 2d, F. W. Sargent, $2; 3d, Col. Frederick Mason, $1.

Sutton's Excelsior:
1st, G. B. Gill, $3; 2d, W. J. Clemson, $2; 3d, F. W. Sargent, $1.
Any other variety:
1st, William Whitman, $3; 2d, T. D. Hatfield, $2; 3d, Col. Frederick Mason, $1.
Collection of five varieties, fifty pods each:
1st, Mrs. A. A. Warburton, $5; 2d, Col. Frederick Mason, $3; 3d, F. W. Sargent, $1.

COLLECTION OF VEGETABLES.— Ten varieties, tastefully arranged:
1st, Col. Frederick Mason, $10; 2d, W. Heustis & Son, $8; 3d, Mrs. A. A. Warburton, $6.

Gratuities:—

W. J. Clemson, two plates of Tomatoes, $2.
G. H. Arnold & Son, Tomatoes, $1.
Faulkner Farm, Mushrooms, $2.
Boston Market Gardeners' Association, collection of vegetables, $10.

SWEET PEA EXHIBITION.

JULY 11 AND 12.

William J. Walker Fund.

BEANS.— String, two quarts:
1st, Col. Frederick Mason, $3; 2d, Col. Frederick Mason, $2; 3d, M. E. Moore, $1.

CABBAGES.— Four specimens:
1st, W. Heustis & Son, Succession, $4; 2d, W. Heustis & Son, Copenhagen Market, $3; 3d, M. E. Moore, $2.

CAULIFLOWERS.— Four specimens:
1st, W. H. Allen, $4.

CARROTS.— Six specimens:
1st, Col. Frederick Mason, $3; 2d, W. Heustis & Son, $2; 3d, Oliver Ames, $1.

LETTUCE.— Four heads:
1st, W. J. Clemson, $3; 2d, Mrs. A. A. Warburton, $2; 3d, Oliver Ames, $1.

POTATOES.— Twelve specimens:
1st, Oliver Ames, $3; 2d, J. W. Stone, $2.

TOMATOES.— Twelve specimens:
1st, Wilfrid Wheeler, $3; 2d, Oliver Ames, $2; 3d, J. W. Stone, $1.

COLLECTION OF VEGETABLES.— Twelve varieties, tastefully arranged:
1st, W. J. Clemson, $15; 2d, Oliver Ames, $10; 3d, Col. Frederick Mason, $8.

Gratuities:—

Mrs. A. A. Warburton, collection of Peas, $2.
Boston Market Gardeners' Association, Cucumbers, $1.
" " " " collection of vegetables, $20.
Hermine Schuls, " " " $2.

GLADIOLUS AND PHLOX EXHIBITION.

AUGUST 8 AND 9.

BEANS.— Two quarts, shelled, not Lima:
1st, Col. Frederick Mason, $3; 2d, Mrs. A. A. Warburton, $2; 3d, D. L. Fiske, $1.
String, four quarts:
1st, F. W. Sargent, $3; 2d, Col. Frederick Mason, $2; 3d, Col. Frederick Mason, $1.
CUCUMBERS.— White Spine variety:
1st, N. F. Comley, $3; 2d, N. F. Comley, $2.
CABBAGES.— Four specimens:
1st, W. Heustis & Son, $3; 2d, J. B. Shurtleff, Jr., $2; 3d, Col. Frederick Mason, $1.
PEPPERS.— Twelve specimens, Bell or Bull Nose:
1st, F. W. Sargent, $3; 2d, J. B. Shurtleff, Jr., $2.
Twelve specimens, any other variety:
1st, Oliver Ames, $3; 2d, J. B. Shurtleff, Jr., $2; 3d, J. W. Stone, $1.
SQUASHES.— Marrow, three specimens:
1st, W. Heustis & Son, $3; 2d, Col. Frederick Mason, $2; 3d, F. W. Sargent, $1.
SWEET CORN.— Twelve ears, Crosby:
1st, J. W. Stone, $3; 2d, Col. Frederick Mason, $2.
Twelve ears, any other variety:
1st, D. L. Fiske, $3; 2d, Col. Frederick Mason, $2; 3d, A. M. Davenport, $1.
ONIONS.— Twelve specimens:
1st, Oliver Ames, $4; 2d, W. Heustis & Son, $3; 3d, F. W. Sargent, $2.
COLLECTION OF VEGETABLES.— Fifteen varieties:
1st, Oliver Ames, $10; 2d, Col. Frederick Mason, $8.
Eight varieties:
1st, D. L. Fiske, $5; 2d, Mrs. A. A. Warburton, $4; 3d, F. W. Sargent, $3.

Gratuities:—

Jordan Farm, collection of Potatoes, $2.
N. F. Comley, collection of Cucumbers, $2.
J. W. Stone, box of Sweet Corn, Vote of Thanks.
" " " " "Potatoes, " " "
A. M. Davenport, box of Sweet Corn Golden Dawn, Vote of Thanks.

Fruit and Vegetable Exhibition.

October 3 and 4.

Benjamin V. French Fund No. 2.

Collection of Vegetables.— Twelve kinds, not more than one variety of a kind:
1st, Oliver Ames, $25; 2d, Col. Frederick Mason, $15.
Six kinds, not more than one variety of a kind:
1st, Mrs. A. A. Warburton, $15; 2d, J. A. Nixon, $10; 3d, F. W. Sargent, $8.
Six kinds, distinct species (for cottagers only):
1st, Michael Cahalan, $8; 2d, D. L. Fiske, $6; 3d, Mrs. A. A. Warburton, $4.

William J. Walker Fund.

Beans.— Lima, any variety, four quarts, pods:
1st, F. W. Sargent, $4; 2d, F. W. Sargent, $3; 3d, Oliver Ames, $2.
Lima, any variety, shelled; for cottagers only:
1st, Michael Cahalan, $3; 2d, G. B. Gill, $2; 3d, D. L. Fiske, $1.
String, four quarts:
1st, J. Bauernfeind, $3; 2d, William Whitman, $2; 3d, F. W. Sargent, $1.
Wax, four quarts:
1st, William Whitman, $3; 2d, Oliver Ames, $2.
Beets.— Any round variety, twelve roots:
1st, Col. Frederick Mason, $3; 2d, Col. Frederick Mason, $2; 3d, Oliver Ames, $1.
Any round variety, six roots; for cottagers only:
1st, Michael Cahalan, $3; 2d, Michael Cahalan, $2; 3d, F. W. Dahl, $1.
Chard, three plants:
1st, Col. Frederick Mason, $3; 2d, Michael Cahalan, $2; 3d, D. R. Craig, $1.
Brussels Sprouts.— Four quarts:
1st, A. W. Preston, $4.

Society's Prizes.

CABBAGES.— Any ball head variety, green, four heads:
1st, Col. Frederick Mason, $4; 2d, Mrs. J. L. Gardner, $3; 3d, Mrs. Frederick Ayer, $2.

Any flat head variety, four heads:
1st, D. R. Craig, $4; 2d, Mrs. J. C. Phillips, $3; 3d, Col. Frederick Mason, $2.

Savoy, four heads:
1st, Mrs. J. L. Gardner, $4; 2d, F. W. Sargent, $3; 3d, Mrs. J. C. Phillips, $2.

Red, four heads:
1st, Col. Frederick Mason, $4; 2d, F. W. Sargent, $3; 3d, D. R. Craig, $2.

Any green variety, three heads; for cottagers only:
1st, Mrs. A. A. Warburton, $4; 2d, Michael Cahalan, $3; 3d, Michael Cahalan, $2.

CARROTS.— Danvers, twelve roots:
1st, Col. Frederick Mason, $4; 2d, Col. Frederick Mason, $3; 3d, Oliver Ames, $2.

Any red or orange variety longer than Danvers, twelve roots:
1st, Col. Frederick Mason, $4.

CAULIFLOWERS.— Three heads:
1st, Col. Frederick Mason, $4; 2d, D. R. Craig, $3.

CELERY.— Boston Market, four heads:
1st, D. R. Craig, $3; 2d, W. Heustis & Son, $2; 3d, Col. Frederick Mason, $1.

Giant Pascal, four heads:
1st, Col. Frederick Maons, $3; 2d, F. W. Sargent, $2; 3d, D. R. Craig, $1.

Paris Golden or Golden Rose, four heads:
1st, Col. Frederick Mason, $3; 2d, Michael Cahalan, $2; 3d, Oliver Ames, $1.

White Plume, four heads:
1st, Col. Frederick Mason, $3; 2d, J. A. Nixon, $2; 3d, D. R. Craig, $1.

Any red or pink variety other than Golden Rose, four heads:
1st, Oliver Ames, $3; 2d, J. A. Nixon, $2.

CUCUMBERS.— White Spine type, four specimens:
1st, Boston Gardening Co., $3; 2d, Boston Gardening Co., $2.

EGG PLANT.— Four specimens:
1st, Oliver Ames, $3; 2d, F. W. Sargent, $2; 3d, Mrs. J. C. Phillips, $1.

KOHL RABI.— Six roots:
1st, F. W. Dahl, $3; 2d, Mrs. H. B. Nichols, $2; 3d, Oliver Ames, $1.

LETTUCE.— Cos or Romaine, six specimens:
1st, William Whitman, $3; 2d, William Whitman, $2.
Round headed, six specimens:
1st, William Whitman, $3.
ONIONS.— Ailsa Craig, twelve specimens:
1st, Oliver Ames, $5; 2d, F. W. Sargent, $3.
Danvers, twelve specimens:
1st, Oliver Ames, $5; 2d, A. W. Preston, $3; 3d, Frederic Cole, $2.
Any red variety, twelve specimens:
1st, Oliver Ames, $5; 2d, Oliver Ames, $3; 3d, Col. Frederick Mason, $2.
PARSNIPS.— Twelve specimens:
1st, D. L. Fiske, $4; 2d, Col. Frederick Mason, $3; 3d, Mrs. A. A. Warburton, $2.
PEPPERS.— Twelve specimens:
1st, Col. Frederick Mason, $4; 2d, Oliver Ames, $3; 3d, Col. Frederick Mason, $2.
POTATOES.— Early Rose type, twelve specimens:
1st, Col. Frederick Mason, $5; 2d, Charles Scully, $4; 3d, Col. Frederick Mason, $3.
Green Mountain type, twelve specimens:
1st, E. L. Lewis, $5; 2d, Charles Scully, $4; 3d, E. L. Lewis, $3.
Any other variety, twelve specimens:
1st, D. R. Craig, $5; 2d, Charles Scully, $4; 3d, E. L. Lewis, $3.
Collection, not less than six varieties:
1st, Col. Frederick Mason, $10; 2d, Col. Frederick Mason, $8.
PUMPKIN OR SQUASH.— Heaviest specimen, any variety:
Patrick Minton, $5.
Sugar or Winter Luxury, four specimens:
1st, S. D. Goff, $5; 2d, Col. Frederick Mason, $3; 3d, Mrs. Frederick Ayer, $2.
RADISHES.— White Stuttgart or other winter variety, twelve specimens:
2d, J. A. Nixon, $2.
SALSIFY.— Twelve specimens:
1st, A. W. Preston, $3; 2d, William Whitman, $2.
SQUASHES.— Bay State, three specimens:
1st, Col. Frederick Mason, $3.
Delicious, three specimens:
1st, Oliver Ames, $3; 2d, Col. Frederick Mason, $2; 3d, D. L. Fiske, $1.
Essex Hybrid or Warren, three specimens:
1st, W. Heustis & Son, $3; 2d, Col. Frederick Mason, $2.
Hubbard or any of its varieties, three specimens:
1st, W. Heustis & Son, $3; 2d, Col. Frederick Mason, $2.
Any other winter variety, three specimens:
1st, Col. Frederick Mason, $3; 2d, Col. Frederick Mason, $2; 3d, Col. Frederick Mason, $1.

TOMATOES.— Any forcing variety grown under glass, twelve specimens:
1st, Oliver Ames, $4; 2d, Mrs. Frederick Ayer, $3; 3d, Mrs. Frederick Ayer, $2.
Any outdoor scarlet variety, twelve specimens:
1st, Oliver Ames, $3; 2d, Oliver Ames, $2; 3d, Col. Frederick Mason, $1.

TURNIPS.— Any early white flat or purple top white flat variety, twelve specimens:
1st, Oliver Ames, $3; 2d, G. F. Wheeler, $2.
Any globe variety, twelve specimens:
1st, Oliver Ames, $3; 2d, Charles Scully, $2; 3d, Oliver Ames, $1.
Rutabaga, any variety, six specimens:
1st, Col. Frederick Mason, $4; 2d, Col. Frederick Mason, $3.

HERBS.— Green, fresh, largest and best collection, tastefully arranged, with cards explaining the general use or uses of each variety:
1st, J. A. Nixon, $5; 2d, Mrs. A. A. Warburton, $3; 3d, Mrs. F. C. Upham, $2.

SALAD PLANTS.— Best collection:
1st, Mrs. A. A. Warburton, $6; 2d, E. L. Lewis, $4; 3d, J. A. Nixon, $3.
Any variety of vegetable not mentioned in this list:
1st, D. R. Craig, $4; 2d, A. W. Preston, $3; 3d, D. R. Craig, $2.
For the best display of vegetables put up in glass jars:
1st, Mrs. G. B. Gill, $12; 2d, Mrs. F. C. Upham, $10.
For the best improved vegetable exhibited in the year 1914:
J. B. Shurtleff, Jr., improved Squash, Silver Medal.

Gratuities:—

C. W. Rowley, Squash and Peanuts, $2.
Boston Market Gardeners' Association, collection of vegetables, $10.
Mrs. N. P. Cutler, " " " $1.

CHRYSANTHEMUM SHOW.

NOVEMBER 5, 6, 7, AND 8.

COLLECTION OF VEGETABLES.— Twelve varieties, not more than one variety of a kind:
1st, Col. Frederick Mason, $12.
Eight varieties:
1st, F. W. Sargent, $8; 2d, Mrs. A. A. Warburton, $6; 3d, J. A. Nixon, $4.
Collection of vegetables exhibited by seedsmen:
1st, T. J. Grey Co., Silver Medal.

Gratuities:—

Mrs. Frederick Ayer, collection of Lettuce, $1.
Boston Gardening Co., collection of Cucumbers, $1.
W. Heustis & Son, collection of Celery, $1.
Boston Market Gardeners' Association, collection of vegetables, $15.
T. J. Grey Co., " " " $3.
Col. Frederick Mason, " " " $2.

GRENVILLE L. WINTHROP ESTATE, LENOX, MASS.

REPORT OF THE COMMITTEE ON GARDENS FOR THE YEAR 1914.

JOHN K. M. L. FARQUHAR, CHAIRMAN.

The Committee on Gardens has to report an important year in its history. The departure from the usual methods begun the previous year has been continued through the present season and the results have been satisfactory. Instead of visits to many different localities the main part of the committee's work has been concentrated in one place, a plan which has already developed far reaching benefits to the Society. A detailed account of the visits of the year is given herewith.

DR. HARRIS KENNEDY'S IRIS GARDEN.

July 8. The first visit of the season was made on this date to the estate of Dr. Harris Kennedy at Milton to see his collection of Japanese irises.

Since the visit of the Garden Committee to this garden three years ago, Dr. Kennedy has not only continued his interest in the culture of this flower but has added many new varieties and made improvements in the arrangement of the gardens. An attractive feature was the construction of a summer house, after real Japanese designs and set up by Japanese workmen, from which the visitor can leisurely enjoy the brilliant display spread out before him.

The committee wishes particularly to commend such special gardens devoted to a single family of flowering plants, which it is to be noted are becoming every year more common.

Visit to Lenox and Stockbridge Estates.

August 24–26. Estates and gardens of Lenox and Stockbridge have long been famous as examples of the highest development of landscape gardening in this section of the country. Their charm is doubtless influenced in great measure by their natural surroundings, occupying as they do commanding positions among the Berkshire Hills, where on every side are grand vistas of mountain scenery.

By invitation of the Lenox Horticultural Society, supplemented by the courteous permission of the owners of estates in that vicinity, the committee on gardens of the Massachusetts Horticultural Society spent two days this week visiting fourteen of the notable gardens located there. The objects of the visit were to note the development of ornamental horticulture in this State, to cultivate a closer affiliation with the various horticultural interests of New England, and to report in the transactions of the society a statement of the progress made.

The Allen Winden Farm, an estate of two hundred acres, owned by Charles Lanier, was the first place seen. The location overlooks the Stockbridge Bowl and commands extensive views of the noble Taconic range of mountains across the intervening valley. The gardens here were bright with summer flowering plants and the groups of coniferous trees were especially interesting. A. H. Wingett is the superintendent here, a position which requires a high degree of horticultural skill and knowledge.

Elm Court, the residence of William D. Sloane, was next on the list. This is an estate of one thousand acres, two of which are devoted to flower gardens. The extensive lawns are bordered by trees and flower beds with a terraced Italian garden. It was highly commended by the committee as an example of artistic landscape arrangement. Frederic Heeremans has charge of the grounds and greenhouses here.

High Lawn, the residence of W. B. O. Field, came next. It occupies an elevated site with a magnificent grove of white pines near the house. A large area is devoted to ornamental planting and a swimming pool of liberal dimensions is a noticeable feature. George Foulsham is the superintendent in charge here. Adjoining

MISS ADELE KNEELAND ESTATE, LENOX, MASS.

this estate is that of George Westinghouse, Edward J. Norman, superintendent. A tasteful arrangement of trees and an unusually fine display of flowering plants characterized this place.

White Lodge, occupied by A. R. Shattuck, is an estate comprising 125 acres, a good deal of it in woodland. It has many features of interest, notably a "White Garden" composed exclusively of white flowers, while at the end of a linden-bordered avenue is another garden filled with masses of brilliantly flowered herbaceous perennials. The extensive grounds are well planned and arranged with great artistic effect. An interesting rock garden was also noted. Alexander McLeod has charge of the grounds here.

Bellefontaine Gardens, the home of Giraud Foster, is an estate of about two hundred acres in charge of Edwin Jenkins. This place is embellished with an elaborate Italian garden, with many fine specimens of marble statuary. The magnificent mansion is modelled after Le Petit Trianon of Versailles, France, and the formal gardens surrounding it are of noteworthy interest.

Next came Wyndhurst, the estate of William E. S. Griswold, comprising four hundred acres. It has a great stretch of lawn with a fine grouping of trees and from the front of the house commands a grand view of Greylock mountain in the far distance. The floricultural feature of this place is the enclosed gardens of flowers. There are also numerous fine specimen trees. Alfred Loveless is the superintendent of this estate.

Blantyre, the residence of R. W. Paterson, is an estate of 250 acres in charge of Thomas Proctor as superintendent. It presents a beautiful example of landscape gardening, with well-arranged groupings of trees. In addition to the horticultural features of this estate the committee had the privilege of inspecting the notable collection of paintings and procelains gathered by Mr. Paterson from all parts of the world and deposited in a building especially erected for them.

The estate of Miss Adele Kneeland of twelve acres showed the hand of an enthusiastic expert in flower gardening. It contains a notable phlox garden, brilliant in the August sunshine, also numerous formal gardens with water basins and fountains. A very interesting Alpine wall garden is another feature of this place. Miss Kneeland's personal interest in her gardens was very pleasing to the visitors. Alfred Etherington is the head gardener here.

Groton Place, the notable estate of Grenville L. Winthrop, contains 250 acres in charge of William Henry as head gardener. Simplicity of arrangement and harmony of planting are its noteworthy features. There are noble groups of trees artistically arranged and magnificent stretches of smoothly shaven lawns. An atmosphere of restfulness and peace seemed to pervade the place. A magnificent plant of *Hydrangea petiolaris* climbing high upon the front wall of the house attracted much attention.

Tanglewood, the estate of R. C. Dixey of Boston, has noteworthy and elaborate gardens under the care of Alexander MacConnachie, the superintendent of the place. The estate borders the northern end of the Stockbridge Bowl, and is of peculiar interest because it contains the site of the "little red house" once the home of Nathaniel Hawthorne.

Wheatleigh, the home of Carlos De Heredia, an estate of 240 acres, is elaborate and beautiful. A grand court with a magnificent fountain occupies the foreground of the mansion and formal gardens are arranged around it. Lower down on the slope is a series of flower gardens, and the blue spruce trees on the estate are unusually fine specimens. The grounds are partly in Lenox and partly in Stockbridge and are in charge of George H. Thompson.

Naumkeag, the residence of Hon. Joseph H. Choate, is in Stockbridge and comprises an area of about seventy acres situated on a rather steep hillside. On the side of the hill is a formal garden with Italian effect showing a very good example of a battlement hedge in hemlock. There are also numerous trimmed pillar-like evergreen trees and a remarkable avenue suggesting the "Unter den Linden." George Breed has charge of this place, which presents some features of bold landscape treatment making it of noteworthy horticultural interest.

A brief call was made at Clovercroft, the estate of Mrs. Oscar Iasigi of Boston. This place of fifty acres is in Stockbridge and is of especial interest on account of the numerous flower gardens enclosed by hedges of hemlock and hornbeam. It brought to mind the fashion of a past generation now superseded by the more open and natural arrangement. William T. Donaldson is the head gardener of this estate.

Nearly all of the estates had other features of horticultural interest, especially the greenhouses containing the decorative foliage plants, the orchids, the palms and ferns, and the fruits. Every place had its distinctive features, illustrating the various tastes and requirements of its owner, but everywhere in the conservatories and reception halls was observed the Canterbury bells (*Campanula pyramidalis*) showing its popularity and effectiveness as a decorative plant.

The formal and so-called Italian garden still seems to hold a strong place in the planning of the modern estate, and as stated by Guy Lowell "in recent years there has been a revival of interest in the formal garden in this country. Foreign travel may in part account for this, but still more important factors are the interest that has sprung up in all that relates to outdoor life. As a consequence formal gardens have been created side by side with the natural, and the discussion of the relative merits of the two styles has been revived on this side of the Atlantic."

The visiting committee consisted of J. K. M. L. Farquhar, president of the society and chairman of the garden committee; William P. Rich, secretary; William J. Stewart, editor of horticulture, and Jackson Dawson, William Nicholson, A. H. Fewkes, D. R. Craig, T. D. Hatfield, Robert Cameron, Charles W. Parker, and M. H. Norton. The visitors were hospitably entertained by the Lenox Horticultural Society, several of whose officers acted as guides to the various estates.

Awards made by the Committee on Gardens.

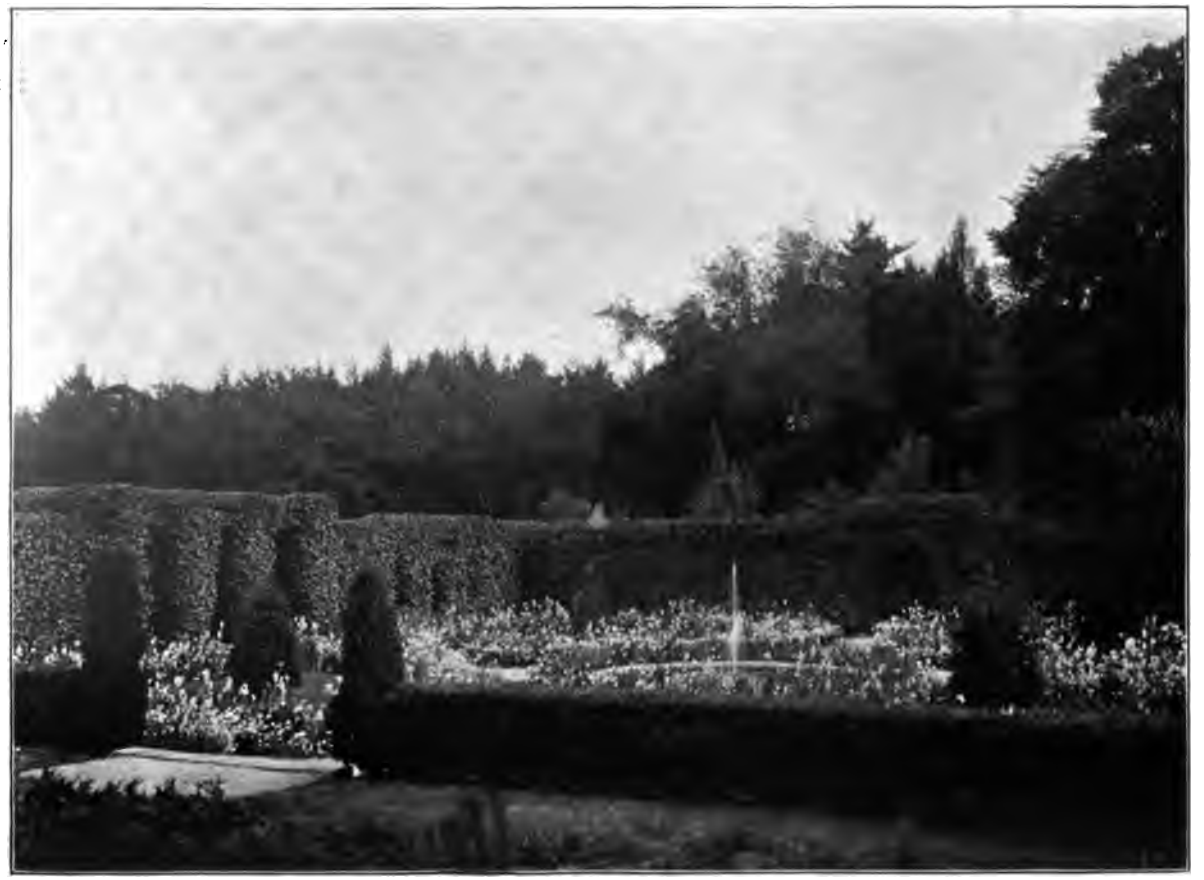
1914.

Dr. Harris Kennedy, Milton, for garden of Japanese irises, Silver Medal

Joseph H. Choate, Stockbridge, for topiary gardening, Silver Medal

W. B. O. Field, Lenox, for effective avenue planting, Silver Medal

Giraud Foster, Lenox, for elaborate formal arrangement of Bellefontaine Gardens, Silver Medal
William E. S. Griswold, Lenox, for artistic planting of grounds and placing of gardens, Silver Medal
Carlos De Heredia, Lenox, for artistic planting in connection with architectural features, Silver Medal
Miss Adele Kneeland, Lenox, for well arranged formal garden, Silver Medal
Charles Lanier, Lenox, for artistic landscape planting, Silver Medal
R. W. Paterson, Lenox, for excellence of parterre gardening, Silver Medal
A. R. Shattuck, Lenox, for artistic flower gardening, Silver Medal
William D. Sloane, Lenox, for excellence in landscape effects, Silver Medal
Grenville L. Winthrop, Lenox, for harmonious lawn and woodland effects, Silver Medal
A. H. Wingett, for skilful gardening as shown on the Allen Wynden Farm, Lenox, Honorable Mention
Frederic Heeremans, for skilful gardening as shown on the Elm Court Estate, Lenox, Honorable Mention
George Foulsham, for skilful gardening as shown on the High Lawn Estate, Lenox, Honorable Mention
Edward J. Norman, for skilful gardening as shown on the George Westinghouse Estate, Lenox, Honorable Mention
Alexander McLeod, for skilful gardening as shown on the White Lodge Estate, Lenox, Honorable Mention
Edwin Jenkins, for skilful gardening as shown in the Bellefontaine Gardens, Lenox, Honorable Mention
Alfred Loveless, for skilful gardening as shown on the Wyndhurst Estate, Lenox, Honorable Mention
Thomas Proctor, for skilful gardening as shown on the Blantyre Estate, Lenox, Honorable Mention
Alfred Etherington, for skilful gardening as shown on the Miss Adele Kneeland Estate, Lenox, Honorable Mention
William Henry, for skilful gardening as shown on the Groton Place Estate, Lenox, Honorable Mention
Alexander MacConnachie, for skilful gardening as shown on the Tanglewood Estate, Lenox, Honorable Mention



THE WHITE GARDEN. A. R. SHATTUCK ESTATE, LENOX, MASS.

George H. Thompson, for skilful gardening as shown on the Wheatleigh Estate, Lenox, Honorable Mention

George Breed, for skilful gardening as shown on the Naumkeag Estate, Lenox, Honorable Mention

JOHN K. M. L. FARQUHAR, *Chairman*
ROBERT CAMERON
DAVID R. CRAIG
JACKSON T. DAWSON
ARTHUR H. FEWKES
T. D. HATFIELD
RICHARD HITTINGER
DR. HARRIS KENNEDY
WILLIAM NICHOLSON
THOMAS ROLAND
CHARLES SANDER
WILFRID WHEELER

Committee on Gardens.

REPORT OF THE COMMITTEE ON CHILDREN'S GARDENS.

By Henry Saxton Adams, Chairman.

The growth in gardening among the children throughout the State has continued with remarkable rapidity and the Exhibition of Children's Garden Products held by this committee at Horticultural Hall, September 5th and 6th, showed what satisfactory results are being obtained. This exhibition has grown to such an extent that this year your committee experienced considerable difficulty in arranging and judging the exhibits.

It may be interesting to know the growth in the number of awards made during the last few years. In 1912 there were 108 prizes, in 1913 there were 168, and in 1914 there were 192. We not only awarded more prizes this year then ever before but there were many exhibitors who left the hall without any award of any kind which has never happened before, it having been our previous desire to give every child some encouragement, however small it might be. We now feel that only really meritorious exhibits should receive awards and that the children appreciate that quality as well as quantity are desired. Our new schedule has been prepared and we offer liberal prizes in all classes.

The appropriation for 1914, included the $200.00 given by the Commonwealth of Massachusetts for the encouragement of gardening among the children of the State and without this additional amount we could hardly have suitably rewarded the exhibitors. The number of exhibitors and the quality of the material brought in has made it possible for us to raise our standard of excellence and many of the exhibits are in every way as good as those seen at our regular exhibitions.

Through the courtesy of Messrs. Ginn & Co., a copy of Meier's Home and School Gardens was awarded to every child winning a first prize in the exhibition. This book is considered by many

the best authority on the subject and we hope will stimulate interest among the children.

We are glad to welcome several new members to our committee and know they will be needed at the next exhibition. We feel that with the continued interest in the children's garden work of the Society we will have an exhibit in 1915 which will be larger than ever and of interest to every member of the Society and to the public at large. Every effort will be made on the part of the committee for our Exhibition to be held Saturday and Sunday, August 28 and 29, 1915, which promises to fill all the available space. We hope to see a large number of our members among the visitors, to see and encourage the children's work.

The list of prizes awarded follows:

HENRY SAXTON ADAMS
MRS. AUGUSTUS HEMENWAY
HARRY S. RAND
MISS MARGARET A. RAND
WILLIAM P. RICH
JAMES WHEELER

Committee on Children's Gardens.

PRIZES AND GRATUITIES AWARDED DURING THE YEAR 1914 BY THE COMMITTEE ON CHILDREN'S GARDENS.

SEPTEMBER 5 AND 6.

For the best collection of vegetables from a school garden:

First.— Hawthorne Club School, Weymouth	$6 00
Second.— South End Industrial School, Roxbury	5 00
Third.— Waltham School Gardens	4 00

For the best collection of vegetables from a school garden established since 1909:

First.— Huntington School, Brockton	5 00
Second.— Belcher School Garden, Milton	4 00
Third.— Groton School Gardens	3 00
Fourth.— Brook Road School, Milton	2 00
Fifth.— Jamaica Plain Neighborhood House	1 00

For the best collection of flowers from a school garden:

First.— Groton Boy Scouts	$6 00
Second.— South End Industrial School, Roxbury	5 00
Third.— Crosby School, Arlington	4 00
Fifth.— Roxbury Neighborhood House	2 00
Sixth.— Cable St. Garden School, Roxbury	1 00

For the best collection of flowers from a school garden established since 1909:

First.— Woman's Municipal League Garden	5 00
Second.— Jamaica Plain Neighborhood House	4 00
Third.— Emmanuel House Gardens, Roxbury	3 00
Fourth.— Belcher School Garden, Milton	2 00
Fifth.— Sterling St. Garden, Roxbury	1 00

For the best collection of vegetables from a child's home garden:

First.— Hermine Schulz, Roslindale	5 00
Second.— Robert Fisher, Waltham	4 00
Third.— James W. Carl, Concord	3 00
Fourth.— Evan A. Woodward, Marlboro	2 00

For the best collection of flowers from a child's home garden:

First.— John G. Thatcher, Brookline	5 00
Second.— Martha Townsend, Lynn	4 00
Third.— Gertrude Schulz, Roslindale	3 00
Fourth.— E. Winslow Stratton, Marlboro	2 00

For the best vase of flowers from a child's home garden, arranged with any foliage:

First.— E. Winslow Stratton, Marlboro	3 00
Second.— Martha Townsend, Lynn	2 50
Third.— Lillian M. Bauernfeind, Medford	2 00
Fourth.— William Albrecht, Roslindale	1 50
Fifth.— Estacio Ferriera, Brockton	1 00

For the best potted plant grown by a child in the City of Boston:

First.— Helena Nagel, Roslindale	3 00
Second.— Mary O'Connor	2 00
Third.— William Albrecht, Roslindale	1 00

For the best bouquet of flowers from a child's home garden:

First.— E. Winslow Stratton, Marlboro	3 00
Second.— Rose Furdon, Arlington	2 50
Third.— Helen C. Reddy, Framingham	2 00

Fourth.— Martha Townsend, Lynn $1 50
Fifth.— Gertrude Schulz, Roslindale 1 00

For the best collection of native flowers, berries, leaves, and grasses, correctly named as far as possible:

First.— Lester D. Watson, Dorchester 5 00
Second.— Martha Townsend, Lynn 4 00
Third.— Margaret Hogan, Quincy 3 00
Fourth.— Evelyn A. Fisher, Waltham 2 00
Fifth.— Edward B. Schwamb, Arlington 1 00

For the best three vases of China Asters:

First.— Frank Frazer, Arlington 3 00
Second.— Mary McDermott, Milton 2 00
Third.— Margaret Thatcher, Brookline 1 00

For the best three vases of Dahlias:

First.— Martha Townsend, Lynn 3 00
Second.— Grace Wilbur, Brockton 2 00
Third.— E. Winslow Stratton, Marlboro 1 00

For the best three vases of Gladioli:

First.— Olive Pearl Winters 3 00
Second.— George Sheehan, Arlington 2 00
Third.— John G. Thatcher, Brookline 1 00

For the best six specimens of Beets:

First.— Joseph Leahy, Arlington 3 00
Second.— Hermina Lammers, Roxbury 2 00
Third.— Wilson Walker, Marlboro 1 00

For the best six ears of Green Sweet Corn:

First.— Gregory McDermott, Milton 3 00
Second.— Wilson Walker, Marlboro 2 00
Third.— Edward Reagan, Brockton 1 00

For the best four specimens of Cucumbers:

First.— Evan A. Woodward, Marlboro 3 00
Second.— Wilson Walker, Marlboro 2 00
Third.— E. Winslow Stratton, Marlboro 1 00

For the best plate Green String Beans, fifty pods:

First.— Wilson Walker, Marlboro	$3 00
Second.— Flora Barsam, Roxbury	2 00
Third.— Gladys Grant, Brockton	1 00

For the largest Pumpkin or Squash:

First.— John Houlihan, Arlington	3 00
Second.— Estacio Ferreira, Brockton	2 00
Third.— Wilson Walker, Marlboro	1 00

For the best plate of Carrots, six specimens:

First.— E. Winslow Stratton, Marlboro	3 00
Second.— Dan Barrows, Brockton	2 00
Third.— Wilson Walker, Marlboro	1 00

For the best plate of Tomatoes, six specimens:

First.— James Spadea, Brockton	3 00
Second.— Wilson Walker, Marlboro	2 00
Third.— Ralph J. Walker, Marlboro	1 00

For any other variety of vegetable:

First.— John Houlihan, Arlington	3 00
Second.— Carl Anderson, Brockton	2 00
Third.— John Houlihan, Arlington	1 00

For the best collection of four different vegetables:

First.— Robert Cary, Brockton	5 00
Second.— Evan A. Woodward, Marlboro	3 00
Third.— Gregory McDermott, Milton	2 00

For the best collection of flowers from a roof garden in the City of Boston:

First.— South Bay Union	5 00
Second.— Etta, Annie, Bernie, and Bessie Goldberg	3 00

In addition to these prizes 109 awards ranging from 25 cents to $1.00 were given for other exhibits of merit.

W. B. O. Field Estate, Lenox, Mass.

REPORT OF THE COMMITTEE ON LECTURES AND PUBLICATIONS FOR THE YEAR 1914.

By Wilfrid Wheeler, Chairman.

The lecture course of 1914 was on the whole very satisfactory and particularly that part which was conducted by the Massachusetts Agricultural College consisting of a whole week's course on fruit growing. An average attendance of over 250 was present at these sessions and great interest in the program was aroused. Two very stormy Saturdays kept the attendance down at the lectures on those days.

Never before than at present is the need of an adequate lecture hall more apparent that the lectures may go on without interruption. The coming course will have many breaks in it owing to the impossibility of making the necessary arrangements for the present lecture hall.

There is a continued demand for lectures of this sort but they should be supplemented by some out-of-door demonstrations in practical horticulture and it is hoped that some plan for this may be worked out another year.

The following is the program of lectures and discussions for the year 1915.

January 16. Selection and Care of House Plants. By Frederick E. Palmer, Brookline.

January 30. Conference on Garden Planning and Planting. Conducted by the Staff of the Mass. Agricultural College.

10.00 A.M. Trees and Shrubs for Home Grounds. Prof. A. K. Harrison.

10.45 A.M. Garden Planning. Mr. P. H. Ellwood, Jr.

11.30 A.M. Garden Furnishings. Prof. F. A. Waugh.

1.30 P.M. Practical Management of the Home Flower Garden. Prof. A. H. Nehrling.

2.30 P.M. Herbaceous Annuals and Perennials. Mr. A. S. Thurston.

February 6. The Home Vegetable Garden. By H. F. Tompson, Amherst.

February 13. Conference on Fruit Growing. Arranged by the Mass. Agricultural College.

10.00 A.M. Grafting and Budding. Prof. W. W. Chenoweth.

11.00 A.M. Pruning. Prof. F. C. Sears.

1.30 P. M. Spraying. Prof. R. W. Rees.

2.45 P. M. Small Fruits. Hon. Wilfred Wheeler.

February 27. The Culture of Hardy Shrubs. By Arthur E. Thatcher, Bar Harbor, Maine.

March 6. The Insect Outlook for New England. By Dr. H. T. Fernald, Amherst.

March 13. Hardy Herbaceous Flowers. By W. A. Manda, South Orange, N. J.

March 27. Diseases of the Peony. Illustrated. By Prof. H. H. Whetzell, Ithaca, N. Y. *The John Lewis Russell Lecture.*

WILFRID WHEELER
GEORGE B. DORR
F. C. SEARS
} *Committee on Lectures*

REPORT OF THE DELEGATE TO THE STATE BOARD OF AGRICULTURE FOR THE YEAR 1914.

By Edward B. Wilder, Delegate.

The work of the Board during the year has been along the regular lines. It has favored legislation which would be of benefit to the farmers and opposed that detrimental to them. There has been, however, some special work of great importance in the preparation of two exhibits for the Panama-Pacific Exposition to be held in San Francisco during 1915, one of which is horticultural and one agricultural.

The horticultural exhibit, covering about one acre of ground out of doors, is composed of Massachusetts grown shrubs, also perennials, biennials, and annuals, which are contributed by various nurserymen. This ground, planted to conform as nearly as possible to a Massachusetts Garden, will be arranged by a landscape architect employed by the Board of Agriculture.

The agricultural exhibit is designed to call the attention of people to Massachusetts conditions in agriculture and consists of maps, charts, diagrams, etc., as well as pictures.

It is a remarkable fact that one hundred and five thousand (105,000) copies of circulars and bulletins have been put out during the year, all of which have been on request, as they are not on the mailing list.

Meetings and Exhibitions.

The meetings of the Board were as follows:—

The Summer Field Meeting was held at Lowell, June 24, 1914, on the grounds of the Hood Farm. The program consisted of a demonstration of blasting rocks and stumps and ditching with dynamite, by Winthrop Fillebrown of Bryantville; a demonstration of summer spraying by H. L. Frost of Arlington; a talk on

marketing farm products by the Secretary of Boston Fruit and Produce Exchange, and a talk on swine raising by Professor Frederick C. Minkler of the New Jersey Experiment Station. There was a good attendance and special interest was shown in the demonstrations.

The Public Winter Meeting was held at Worcester, December 1, 2, and 3, in co-operation with the Worcester County Improvement League, the Massachusetts Dairymen's Association, the Massachusetts Milk Inspectors' Association, and the New England Alfalfa Growers' Association. An interesting program was arranged, consisting of lectures on Poultry, Beef production, Dairying, Co-operation in Fruit Growing, Alfalfa, Farm and Household Accounting, and Truck Farming. Moving pictures of various phases of farming in the State were also shown.

In connection with this meeting the board held a Corn and Apple show, and an exhibit of Boys' and Girls' Home and School Garden Club work. The Board also appropriated $500 to the Massachusetts Dairymen's Association for exhibitions of Dairy Products. Two shows were held by the Dairymen from this appropriation, one at Amherst, in connection with Farmers' Week and one at the Public Winter Meeting at Worcester.

The Board also made apple exhibitions at the convention of the International Apple Shippers' Association at Boston in August, and at the Domestic Science Exposition at Mechanics' Hall in October, and appropriated $500 for the Massachusetts prize winners at the New England Fruit Show at Providence in November. These awards as well as the premiums for the shows held at Worcester were taken from the appropriation for special exhibitions.

Publications.

The demand for the publications of the Board has increased very largely during the year. No mailing list is maintained, so publications are only given to those who write or apply for them in person; notwithstanding this, certain of the Bulletins, notably "Apple Growing" and "Poultry Culture" are in such demand that it is difficult to keep them in stock with the present appropriation.

The publications of the Board for the year have been as follows:—

A List of Available Publications, 5000 copies.
Thirteen Nature Leaflets, reprinted, 23,500 copies.
Bulletin No. 1, "Poultry Culture," fourth edition revised, 3,500 copies.
Bulletin No. 2, "Apple Growing," fourth edition, revised, 5,000 copies.
Bulletin No. 6, "Dairying," 2,000 copies.
Circular No. 3, "Balanced rations for Dairy Stock," reprint, 2,000 copies.
Circular No. 4, "Apple Packing for Massachusetts Growers," 1,000 copies.
Circular No. 8, "Cost of Milk Production," 2,000 copies.
Circular No. 9, "What it costs to Produce Milk in New England," 2,000 copies.
Circular No. 11, "Some Bacteriological Aspects of Clean Milk Inspection," 2,500 copies.
Circular No. 12, "Apple Diseases," 500 copies.
Circular No. 13, "Clean Milk Contest, 1913," 2,000 copies.
Circular No. 14, "The Culture of the Currant," 5,000 copies.
Circular No. 15, "Canteloupe Growing in Massachusetts," 5,000 copies.
Circular No. 16, "The Pruning of the Grape," 5,000 copies.
Circular No. 17, "Poultry Feeds and Methods of Feeding," 7,000 copies.
Circular No. 18, "Farm Water Supplies," 4,500 copies.
Circular No. 19, "The New Orchard," 8,000 copies.
Circular No. 20, "Farm Management," 10,000 copies.
Circular No. 21, "Breeding and Feeding Dairy Cattle," 5,000 copies.
Circular No. 22, "The Army Worm," 6,000 copies.
Circular No. 23, "Rural Credit, Banking and Agricultural Co-operation in Europe," 6,000 copies.
Circular No. 24, "Alfalfa Growing," 6,000 copies.
Circular No. 25, "How to Buy Fertilizers," 5,000 copies.
Circular No. 26, "Nut Culture," 5,000 copies.
Circular No. 27, "Peach Growing in Western Massachusetts,"— (from June, 1913, Crop Report) 3,500 copies.
Circular No. 28, "Cooperation," — (from July, 1913, Crop Report) 3,500 copies.
Circular No. 29, "Diversified Farm Accounting," — (from August, 1913, Crop Report) 3,500 copies.
Circular No. 30, "Farm Ice Houses," — (from September, 1913, Crop Report) 4,500 copies.
Apiary Inspection Bulletin No. 7A, "Soft Candy Feed for Bees," 4,000 copies.
Apiary Inspection Bulletin No. 8, "Honey Bees as Pollenizers," 3,500 copies.
List of Farms for Sale, 1,500 copies.

"Agriculture of Massachusetts" for 1913, was also printed. In publishing this book the number of copies has been reduced to

5,000, and special articles from it have been issued as circulars. This has considerably reduced the cost of the report and at the same time has resulted in a wider distribution of the information contained in it.

The Annual Report of the Experiment Station was omitted this year, which reduced the size of the volume to 478 pages. In addition to the report of the Secretary, it contains the report of the State Nursery Inspector, the State Ornithologist, the State Apiary Inspector, the State Dairy Bureau, and the State Forester.

Work of the Office.

There has been a large increase in the work of the office, due partially to the wider demand for publications which have been mentioned, and partly also to the large number of callers seeking information about the agricultural resources of the State. The Board has also had charge of the preparation of the Agricultural and Horticultural Exhibits for the Panama-Pacific Exposition, and this has entailed a large amount of work.

VIEW ON GRENVILLE L. WINTHROP ESTATE, LENOX, MASS.

REPORT OF THE SECRETARY AND LIBRARIAN FOR THE YEAR 1914.

Passing in review the work of the Society during the year just closed there appears to have been no prominent feature distinguishing it from that of the average of other years. The usual time-honored exhibitions have been held similar to those of the past, the winter course of lectures on horticultural subjects duly maintained, and the incidental duties and correspondence of the Secretary's office attended to.

While a year like the last by no means indicates any decline of interest in the objects for which the Society was established it points, perhaps, to the desirability of some more progressive action in the near future if the Society is to maintain its prestige as the leader in the horticultural development of this section of the country.

It would be encroaching upon the reports of the various committees to go into the details of their work during the year. Their annual reports, as they have been always, are important records of the progress of horticulture and the Secretary, perhaps more than others, realizes their value from the frequent references to them made necessary by inquiries from horticulturists throughout the country for the information which they contain relating to the introduction of new varieties of plants, flowers, fruits, and vegetables.

The twelve exhibitions as listed in the Schedule of Prizes and Exhibitions have been held, all of which, with the possible exception of the Chrysanthemum Show in November, have been fully up to the Society's high standard of excellence. The interest in the once popular Chrysanthemum Show appears to be on the decline and it is evident that some changes in this exhibition will be necessary if it is to be continued as a "pay show."

In addition to the twelve regular exhibitions a special flower show was held August 18 to 20 in honor of the Thirtieth Convention of the Society of American Florists and Ornamental Horticulturists which was held in Boston on those dates. This exhibition, arranged at short notice, was one of the best of the year, all three halls being well filled with a very attractive collection of plants and flowers, of which the gladiolus was a notable feature.

The usual winter course of lectures was varied somewhat this season by the introduction of a series of lectures and demonstrations on the subject of fruit culture in New England occupying five days in the week of February 24 to 28. The course covered the entire field of orchard fruits, including the selection of sites for the orchard, varieties of fruits best adapted for New England conditions, fertilizing, grafting, pruning, spraying, packing, and marketing the product.

The instructors were mainly from the staff of the Massachusetts Agricultural College and all were experts in the various subjects treated. It offered a valuable opportunity for obtaining the latest and most approved information on the best methods of successful fruit growing in this section of the country. The course proved a marked success, an average of 250 persons being in attendance, practically all of whom were personally interested in some phase of orcharding in New England.

Full reports of these demonstrations as well as of the more formal lectures were published in Part I of the Transactions of the Society for the year 1914.

Through the personal efforts of a special committee of the Trustees, 130 new members were added to the membership list during the year, making the receipts for membership the largest with one exception in the history of the Society.

The publications of the Society and the dates of issue for the year have been as follow:

January 20. Schedule of Prizes and Exhibitions for the year 1914, 60 pp.

April 16. Transactions, 1913, Part II, pp. 133–293 and Plate 3.

August 5. Transactions, 1914, Part I, pp. 1–179.

The Library.

The publication of the catalogue of the library has been further postponed. From one point of view this action will be an advantage as it will permit the addition of a large amount of material which is being daily received.

When the library room of the present building was constructed in 1900 it was thought to afford ample space for as far ahead as it was necessary to look; but already, at the end of fourteen years, the need of additional shelving is being felt and will have to be provided within a very few years.

The library is an important adjunct in the work of the Society and no small share of the Society's reputation is due to its development.

The greater part of the accessions of the year have been horticultural books of the Seventeenth and Eighteenth Centuries which from their historical and bibliographical value are desirable additions while the purchase of recent publications has not been neglected.

One of the most noteworthy of the horticultural publications of the year is the new Standard Cyclopedia of Horticulture of which two volumes have been thus far issued. This work is a condensed horticultural library and is of great value for ready reference on all subjects relating to gardening in general.

William P. Rich,
Secretary and Librarian.

REPORT OF THE TREASURER FOR THE YEAR 1914.

MASSACHUSETTS HORTICULTURAL SOCIETY *in account current with* WALTER HUNNEWELL, *Treasurer, December 31, 1914.*

DR.

Paid for Library from Appropriation	$431.14
" " " " J. W. D. French Fund	96.23
" " " " J. S. Farlow Fund	100.78
" " Heating	1,097.77
" " Lighting	1,878.75
" " Labor	1,936.35
" " Stationery and Printing	1,406.10
" " Postage	230.00
" " Insurance	535.20
" " Incidentals	1,309.42
" " Repairs	926.68
" " Committee on Lectures and Publications	290.48
" " Salaries of Officers	4,384.50
" " " Committee on Plants and Flowers	406.19
" " " " " Fruits	149.00
" " " " " Vegetables	147.00
" " Committee on Prizes & Exhibitions	250.00
" " Expenses Committee on Gardens	301.05
" " Medals	494.39
" " Library Catalogue	132.00
" " Prizes for Plants and Flowers	3,688.00
" " Prizes for Fruits	1,317.00
" " Prizes for Vegetables	1,074.00
" " Prizes for Children's Garden	297.54
" " H. A. Gane Fund	30 00
" " Geo. R. White Medal of Honor	446.30
" " John C. Chaffin Fund	26.00
" " John Lewis Russell Fund	40 00
" " Appn. S. A. F. Convention	500.00
" " Miss M. R. Case Prize	50.00
" " $4000 United Fruit Bonds	3,840.00
" " $4000 Interboro' Bonds	3,920.00
Balance December 31, 1914, Treasurer and Bursar	4,423.76
	$36,155.63

CR.

Balance December 31, 1913			$6,243.08
Received Rents		5,098.41	
" Exhibitions	1,503.50		
" less expenses	814.25	689.25	
" Membership Fees (1057. Income a/c 2525 Perm. Fund)		3,582.00	
" State Bounty		1,000 00	
" Sundry Donations		4.50	
" Mount Auburn Cemetery (1180.12 Income a/c 1180.13 Perm. Fund)		2,360.25	12,734.41
" Interest on securities from the following funds:			
S. Appleton		40 00	
J. A. Lowell		40 00	
T. Lyman		440 00	
J. Bradlee		40 00	
B. V. French		20 00	
H. H. Hunnewell		160 00	
W. J. Walker		94 16	
L. Whitcomb		20 00	
B. B. Davis		20 00	
M. P. Wilder		40 00	
J. L. Russell		40 00	
F. B. Hayes		400 00	
H. A. Gane		40 00	
J. S. Farlow		100 00	
J. D. W. French		200 00	
B. H. Pierce		32 00	
J. C. Chaffin		40 00	
B. V. French, No. 2		120 00	
G. R. White		240 00	
J. S. Farlow, Newton		116 00	
J. A. French		200 00	
			2,442.16
" Interest and dividends on securities other than those for the above funds			9,685.98
" $5000. West End Bonds (due and paid)			5,000.00
" Miss M. R. Case Prize			50.00
			$36,155.63

Assets.

Real Estate	$518,564 63
Furniture and Exhibition Ware	10,796 96
Library	45,110 47
Plates and History	235 50
$2,000 Kansas City, Clinton, and Springfield Bonds	1,980 00
10,000 Lake Shore and Mich. So. Bonds	10,415 25
21,000 City of Newton Bonds	24,228 75
50,000 Atch. Topeka and S. F. Bonds	44,693 25
50,000 Chicago Burl. and Quincy Bonds	50,012 50
10,000 Chicago and West Mich. Bonds	9,987 50
25,000 K. C. F. S. and Memphis Bonds	27,523 75
50,000 C. B. and Q. Illinois Bonds	51,625 00
8,000 Boston and Maine Bonds	8,710 00
4,000 Am. Tel. & Tel. 4% Bonds, 1936	4,110 00
4,000 United Fruit 5% Notes, 1918	3,840 00
4,000 Interboro 5% Bonds, 1966	3,920 00
12,000 Pacific Telephone Bonds	11,670 00
260 shares General Electric Stock	12,909 90
Hayes and Loring, Trustees	2,308 66
Cash in hands of Treasurer and Bursar	4,423 76
	$847,065 88

Liabilities.

Funds invested in Bonds and Stocks:

S. Appleton	Fund	$1,000 00
J. A. Lowell	"	1,000 00
T Lyman	"	11,000 00
J. Bradlee	"	1,000 00
B. V. French, No. 1	"	500 00
H. H. Hunnewell	"	4,000 00
W. J. Walker	"	2,354 43
L. Whitcomb	"	500 00
B. B. Davis	"	500 00
M. P. Wilder	"	1,000 00
J. L. Russell	"	1,000 00
F. B. Hayes	"	10,000 00
H. A. Gane	"	1,179 00
J. S. Farlow	"	2,500 00

J. D. W. French Fund	5,110 86		
B. H. Pierce "	800 00		
J. C. Chaffin "	1,245 89		
B. V. French, No. 2 "	3,000 00		
J. A. French "	5,000 00		
G. R. White "	5,863 08		
J. S. Farlow, Newton "	2,900 42	$61,453	68
Surplus		785,612	20
		$847,065	88

WALTER HUNNEWELL,
Treasurer.

MEMBERSHIP OF MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 31, 1914.

Life Members, December 31, 1913		689	
Added in 1914		101	
Changed from Annual		1	
		791	
Deceased		16	775
Annual Members, December 31, 1913		149	
Added in 1914		29	
		178	
Deceased	2		
Changed to Life	1		
Resigned	6		
Dropped for non-payment of dues	6		
Changed to Corres. Member	1	16	162
Membership, December 31, 1914			937

INCOME FROM MEMBERSHIP

101 New Life members at $30	$3,030	00
29 New Annual Members at $10	290	00
1 changed to Life	20	00
Assessments for 1914	242	00
	$3,582	00

WALTER HUNNEWELL,
Treasurer.

AUDITOR'S CERTIFICATE.

40 STATE STREET, BOSTON,
February 24, 1915.

To the Finance Committee of the
MASSACHUSETTS HORTICULTURAL SOCIETY.

Gentlemen:

As requested by you I have made a thorough audit of the books and general accounting affairs of the MASSACHUSETTS HORTICULTURAL SOCIETY for the year which ended with the thirty-first day of December, 1914, and herewith submit to you my report of the same.

REPORT.

I have proved the correctness of the ledger, journal, and cash books and the small books tributary to the cash books, and saw that all balances were properly carried forward. I examined all vouchers and checks representing the disbursements during the year and found the amount of cash required by the cash book upon the first day of January, 1915, to have been on hand, and also examined the securities of the Society, finding them in all details in accordance with the requirements of the records. I traced all postings from the journal and cash books into the ledger and certify that the balance sheet taken from it as of the 31st of December, 1914, is a correct abstract and that the Treasurer's statement of the assets and liabilities of the Society upon said date is true to the best of my knowledge and belief.

In short, I satisfied myself that the work in connection with the accounting affairs of the Society is being intelligently and faithfully performed and that the books and papers of the Society are in commendable condition.

Yours very respectfully,

ANDREW STEWART,
Certified Public Accountant.

THE ANNUAL MEETING, NOVEMBER 14, 1914.

ANNUAL MEETING FOR THE YEAR 1914.

The Annual Meeting of the Massachusetts Horticultural Society for the year 1914 was held at Horticultural Hall, Boston, on Saturday, November 14, at twelve o'clock, noon, with President Farquhar in the chair.

The call for the meeting was read by the Secretary and the record of the previous meeting was read and duly approved.

The President announced that the Board of Trustees had approved an appropriation of $6000.00 in addition to the income of the special prize funds of the Society for prizes and gratuities for the ensuing year. He then appointed Messrs. Edward B. Wilder, J. Allen Crosby, and William P. Rich a committee to receive, assort, and count the ballots, and to report the number and declared the polls open until three o'clock.

The following motion was offered by Mr. C. H. W. Foster:

Whereas it is some fourteen or fifteen years since the building of this Society was constructed, and

Whereas the needs of the Society and possibility of income from the rental of its hall have changed,

Now, Therefore, be it moved:

That it is the sense of this meeting that the Trustees consider the advisability of reconstructing the interior of the building of the Society, so that it will be better adapted to the purposes of the Society and will bring about an increase in its income, and that the Trustees be requested to make a report upon this subject at a special meeting of the Society, to be called not later than May 1st, 1915.

The motion of Mr. Foster was seconded by Mr. N. T. Kidder and unanimously adopted.

There being no other business the President declared a recess until three o'clock and appointed Mr. Wilder as Chairman *pro tem.*

At three o'clock Chairman Wilder declared the polls closed and the balloting committee proceeded to assort and count the ballots and reported the result as follows:

Whole number of ballots cast, 34.

For President, John K. M. L. Farquhar received 33. For Vice-President, Richard M. Saltonstall, 33. For Trustees for three years, Thomas Allen, 32, F. Lothrop Ames, 34, Thomas Roland, 33, C. S. Sargent, 31.

For Delegate to the State Board of Agriculture for three years, Edward B. Wilder received 32.

For Nominating Committee, David R. Craig received 33, Richard Hittinger, 32, Henry M. Howard, 32, George Page, 32, John L. Smith, 32.

Chairman Wilder then declared the following named persons to be the duly elected officers of the Society for the year 1915:

President	JOHN K. M. L. FARQUHAR
Vice President (for two years)	RICHARD M. SALTONSTALL
Trustees (for three years)	THOMAS ALLEN
	F. LOTHROP AMES
	THOMAS ROLAND
	CHARLES S. SARGENT
Delegate to the State Board of Agriculture (for three years)	EDWARD B. WILDER
Nominating Committee	DAVID R. CRAIG
	RICHARD HITTINGER
	HENRY M. HOWARD
	GEORGE PAGE
	JOHN L. SMITH

The meeting was then dissolved.

WILLIAM P. RICH,
Secretary.

NECROLOGY 1914.

NECROLOGY, 1914.

ELBRIDGE TORREY of Dorchester, Massachusetts, died January 3, 1914, in his 76th year. For more than fifty years he was engaged in the carpet business in Boston, and was actively interested in numerous educational and religious organizations.

He became a member of the Society in 1904 and was a frequent exhibitor of fruits at its exhibitions.

FRANK A. DAY of Newton, Massachusetts, a member of the Society since 1905, died in St. Augustine, Florida, January 15, 1914, at the age of 62. He was engaged in the banking business in Boston.

ISAAC EMERY COBURN of Everett, Massachusetts, died at his home in that city January 22, 1914, at the age of 71. Mr. Coburn became a member of the Society in 1874 and was for many years a frequent exhibitor at its exhibitions, especially of pansies and strawberries. He was noted particularly as a grower of pansies and on his place in Everett had in recent years four acres of this flower under cultivation.

SAMUEL H. WARREN of Weston, Massachusetts, a member of the Society since 1891, died at his home in that town February 19, 1914, in his 78th year. Mr. Warren was an extensive grower and propagator of strawberries and a regular exhibitor of his products for many years at the Society's exhibitions. In addition to the many regular prizes given him he was awarded in 1912 a Silver Medal for his new strawberry the Warren. He also introduced the Hub strawberry which was well spoken of.

JAMES LAWRENCE of Groton, Massachusetts, died in that town February 24, 1914, at the age of 61. He was much interested in general horticulture and farming, and had been a member of the Society since 1876.

R. WILTON LOCKWOOD, of South Orleans, Massachusetts, died in Boston March 20, 1914, at the age of 53 years. Mr. Lockwood was not only one of the most prominent artists in the country but was well known to the horticulturists of Boston and vicinity through his gardens of roses and peonies at South Orleans. These gardens were visited several times in recent years by the Garden Committee of the Society and were awarded Silver Medals in recognition of the skill and taste displayed by Mr. Lockwood in the culture of his favorite flowers.

HON. EBEN S. DRAPER of Hopedale, Massachusetts, died April 9, 1914, in his 56th year. He became a member of the Society in 1894. In addition to his large interests in many manufacturing and commercial enterprises Mr. Draper was greatly impressed with the possibilities of successful agriculture in New England. He carried on a large orchard in Milford to show his faith in apple growing here and was a member of the State Board of Agriculture for several years.

He served as Lieut. Governor of the State in 1908 and as Governor in 1909 and 1910.

FRANCIS SKINNER of Dedham, Massachusetts, a member of the Society since 1899, died May 7, 1914, at the age of 44 years. Mr. Skinner had a beautiful estate in Dedham and was a frequent exhibitor, especially of tropical plants and flowers, at the Society's shows.

JAMES LOVELL LITTLE of Brookline, Massachusetts, died at his home in that town August 20, 1914, in his 69th year. He had been connected with the Society since 1887.

EDWIN H. JOSE of Cambridge, Massachusetts, died September 29, 1914, in his 70th year. Mr. Jose was much interested in the objects of the Society of which he had been a member since 1888. He was especially devoted to the forestry interests of New England.

GARDINER M. LANE of Boston died October 3, 1914, at the age of 55 years. He became a member of the Society in 1905. Mr.

Lane was actively interested in many of the public institutions of Boston, rendering effective service in their behalf.

LANGDON SHANNON DAVIS of Brookline, Massachusetts, died in that town October 25, 1914. He had been a member of the Society since 1899.

MISS CAROLINE LOUISA WILLIAMS FRENCH of Boston, died October 27, 1914, at the age of 81 years. Miss French was a member of a family distinguished in the annals of the Society for its benefactions, to which her own name was added a few years ago in the gift of a sum of money for the purchase of books for the library. She became a member of the Society in 1899.

WILLIAM ENDICOTT of Boston, a member of the Society since 1894, died November 7, 1914, in his 89th year.

Mr. Endicott was an old-time Boston merchant and was influential in the management of many business and charitable organizations.

CHARLES BRADFORD TRAVIS of Brighton, Massachusetts, died November 8, 1914, at the age of 73 years. Mr. Travis became a member of the Society in 1891. He was much interested in fruit culture, especially of pears, and few were the exhibitions of the Society in recent years that did not contain specimens from his trees in Brighton and for which he was the recipient of many awards.

DR. CHARLES SEDGWICK MINOT of Milton, Massachusetts, died at his home in that town November 19, 1914, at the age of 62 years. Dr. Minot in addition to his many professional duties in connection with the Harvard Medical School was much interested in horticulture. He made a specialty of peony growing and had a large and noteworthy collection of this flower. He was a frequent exhibitor at the flower shows and during the present year was awarded a Silver Medal for a new seedling white peony which he named Mrs. C. S. Minot.

JAMES ARTHUR BEEBE of Boston, a member of the Society since 1894, died November 27, 1914, at the age of 68. Mr. Beebe was much interested in horticultural and agricultural matters and had a fine estate of some 300 acres at Falmouth, Massachusetts.

JOSEPH B. ROBINSON of Dorchester, Massachusetts, a member of the Society since 1885, died December 5, 1914, at the age of 65 years. In former years he was well known in horticultural trade circles but in later years had been in other lines of business.

OFFICERS, COMMITTEES, AND MEMBERS, 1914.

CHARLES LANIER ESTATE, LENOX, MASS.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1914.

President.

JOHN K. M. L. FARQUHAR, of Boston.

Vice-Presidents.

WALTER HUNNEWELL, of Boston.
RICHARD M. SALTONSTALL, of Boston.

Treasurer.

WALTER HUNNEWELL, of Boston.

Secretary.

WILLIAM P. RICH, of Chelsea.*

Trustees.

THOMAS ALLEN, of Boston.
F. LOTHROP AMES, of North Easton.
ERNEST B. DANE, of Brookline.
WILLIAM DOWNS, of Chestnut Hill.
ARTHUR F. ESTABROOK, of Boston.
NATHANIEL T. KIDDER, of Milton.
CHARLES W. PARKER, of Boston.
THOMAS ROLAND, of Nahant.
CHARLES S. SARGENT, of Brookline.
STEPHEN M. WELD, of Warehham.
WILFRID WHEELER, of Concord.
EDWARD B. WILDER, of Dorchester.

Delegate to the State Board of Agriculture.

EDWARD B. WILDER

Nominating Committee.

HERBERT A. CLARK
PHILIP DEXTER
ARTHUR H. FEWKES
FREDERICK S. MOSELEY
JOHN L. SMITH

* Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

COMMITTEES FOR 1914.

Finance Committee.

WALTER HUNNEWELL, *Chairman.*
ARTHUR F. ESTABROOK, STEPHEN M. WELD.

Membership Committee.

JOHN K. M. L. FARQUHAR,
WALTER HUNNEWELL, RICHARD M. SALTONSTALL.

Committee on Library.

CHARLES S. SARGENT, *Chairman.*
ERNEST B. DANE, CHARLES S. MINOT.

Committee on Lectures and Publications.

WILFRID WHEELER, *Chairman.*
GEORGE B. DORR, F. C. SEARS.

Committee on Prizes and Exhibitions.

JAMES WHEELER, *Chairman.*
DUNCAN FINLAYSON, PETER FISHER, S. J. GODDARD,
T. D. HATFIELD, DR. W. G. KENDALL,
ALEXANDER MONTGOMERY, EDWARD B. WILDER.

Committee on Plants and Flowers.

T. D. HATFIELD, *Chairman.*
ARTHUR H. FEWKES, DONALD McKENZIE,
JAMES MARLBOROUGH, WILLIAM NICHOLSON,
WILLIAM SIM.

Committee on Fruits.

EDWARD B. WILDER, *Chairman.*
WILLIAM DOWNS, HAROLD L. FROST.

Committee on Vegetables.

DUNCAN FINLAYSON, *Chairman.*
WILLIAM N. CRAIG, HENRY M. HOWARD.

Committee on Gardens.

JOHN K. M. L. FARQUHAR, *Chairman.*
ROBERT CAMERON, DAVID R. CRAIG, JACKSON T. DAWSON,
ARTHUR H. FEWKES, T. D. HATFIELD, RICHARD HITTINGER,
DR. HARRIS KENNEDY, WILLIAM NICHOLSON,
THOMAS ROLAND, CHARLES SANDER, WILFRID WHEELER.

Committee on Children's Gardens.

HENRY S. ADAMS, *Chairman.*
MRS. AUGUSTUS HEMENWAY, HARRY S. RAND,
MISS MARGARET A. RAND, WM. P. RICH, JAMES WHEELER.

MEMBERS OF THE MASSACHUSETTS HORTICULTURAL SOCIETY, 1914.

Revised to December 31, 1914.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following lists are inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

1900 Dr. Henry S. Pritchett, Washington, D. C.
1900 Albert Viger, President of the National Society of Horticulture of France, Paris.
1897 Hon. James Wilson, Ex-Secretary of Agriculture, Washington, D. C.

CORRESPONDING MEMBERS.

1901 George Francis Atkinson, Professor of Botany in Cornell University, Ithaca, N. Y.
1889 Dr. L. H. Bailey, Ithaca, N. Y.
1898 John Gilbert Baker, F. R. S., F. L. S., Kew, England.
1875 Professor William J. Beal, Amherst, Mass.
1911 W. J. Bean, Royal Gardens, Kew, England.
1889 Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.
1900 Col. Gustavus B. Brackett, Pomologist of the United States Department of Agriculture, Washington, D. C.
1911 John Dunbar, Park Department, Rochester, N. Y.
1887 Sir W. T. Thiselton Dyer, K. C. M. G., F. R. S., "Witcombe," Gloucester, England.

1875 PARKER EARLE, President of the American Horticultural Society, Roswell, N. M.
1887 H. J. ELWES, F. R. S., Colesborne, Cheltenham, England.
1889 WILLIAM G. FARLOW, M. D., Professor of Cryptogamic Botany, Harvard University, Cambridge.
1893 B. E. FERNOW, University of Toronto, Toronto, Ontario.
1900 DR. BEVERLY T. GALLOWAY, Director College of Agriculture, Cornell University, Ithaca, N. Y.
1877 GEORGE LINCOLN GOODALE, M. D., Cambridge, Mass.
1895 PROFESSOR BYRON D. HALSTED, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.
1914 C. S. HARRISON, York, Nebraska.
1911 PROFESSOR U. P. HEDRICK, New York Agricultural Experiment Station, Geneva, N. Y.
1907 DR. AUGUSTINE HENRY, Cambridge, England.
1897 J. W. HOFFMANN, Colored State University, Orangeburg, S. C.
1906 SENOR DON SALVADOR IZQUIERDO, Santiago, Chile.
1889 PROFESSOR WILLIAM R. LAZENBY, Department of Horticulture and Forestry; Secretary College of Agriculture and Domestic Science, Ohio State University, Columbus, O.
1911 ÉMILE LEMOINE, Nancy, France.
1875 T. C. MAXWELL, Geneva, N. Y.
1911 J. EWING MEARS, M. D., Philadelphia, Pa.
1911 WILHELM MILLER, Superintendent of Horticulture, University of Illinois, Urbana, Illinois.
1898 SIR FREDERICK W. MOORE, Curator of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.
1887 SIR DANIEL MORRIS, C. M. G., D.Sc., M. A., F. L. S.
1898 PETER NØVIK, Secretary of the Norwegian Horticultural Society, Christiania.
1912 C. HARMAN PAYNE, London, England.
1906 LIEUT. COL. DAVID PRAIN, Director of the Royal Botanic Gardens Kew, England.
1894 CAVALIÈRE ENRICO RAGUSA, Palermo, Sicily.
1906 DR. HENRY L. RIDLEY, Director of the Botanic Garden, Singapore.
1898 BENJAMIN LINCOLN ROBINSON, PH.D., Curator of the Gray Herbarium of Harvard University, Cambridge.
1875 WILLIAM ROBINSON, Editor of Gardening Illustrated, London.
1899 WILLIAM SALWAY, Superintendent of Spring Grove Cemetery Cincinnati, O.
1875 ROBERT W. STARR, Wolfville, N. S.
1893 PROFESSOR WILLIAM TRELEASE, University of Illinois, Urbana, Illinois.
1882 H. J. VEITCH, Chelsea, England.
1905 MAURICE L. de VILMORIN, Paris, France.

1905 PHILIPPE L. de VILMORIN, Paris, France.
1912 PROFESSOR HUGO de VRIES, University of Amsterdam, Amsterdam, Holland.
1894 WILLIAM WATSON, Curator of Royal Botanic Gardens, Kew, England.
1906 MISS E. WILLMOTT, Essex, England.
1911 E. H. WILSON, Jamaica Plain, Mass.
1901 PROFESSOR L. WITTMACK, Secretary of the Royal Prussian Horticultural Society, Berlin, Prussia.

LIFE MEMBERS.

1899 Adams, Mrs. Charles Francis, South Lincoln.
1907 Adams, George E., Kingston, R. I.
1897 Adams, Henry Saxton, Jamaica Plain.
1899 Agassiz, Mrs. George R., Yarmouth Port.
1894 Allen, Hon. Charles H., Lowell.
1898 Allen, Thomas, Boston.
1899 Ames, F. Lothrop, North Easton.
1914 Ames, Mrs. F. L., North Easton.
1899 Ames, John S., North Easton.
1899 Ames, Miss Mary S., North Easton.
1894 Ames, Oakes, North Easton.
1899 Ames, Oliver, North Easton.
1900 Ames, Mrs. Oliver, Sr., North Easton.
1900 Ames, Miss Susan E., North Easton.
1867 Amory, Frederic, Boston.
1899 Anderson, Lars, Brookline.
1911 Anderson, William, South Lancaster.
1864 Andrews, Charles L., Milton.
1871 Appleton, Hon. Francis H., Boston.
1914 Appleton, Francis R., New York, N. Y.
1913 Appleton, Henry Saltonstall, Boston.
1914 Apthorp, Mrs. Harrison O., Milton.
1900 Arnold, Mrs. George Francis, Brookline.
1894 Ash, John, Pomfret Centre, Conn.
1890 Atkins, Edwin F., Belmont.
1914 Ayer, Mrs. Frederick, Boston.
1899 Ayer, James B., Boston.

1912 Bache, James S., Sharon, Conn.
1905 Backer, Clarence A., Melrose.
1914 Bacon, Miss E. S., Jamaica Plain.
1905 Badger, Walter I., Cambridge.
1894 Bailey, Jason S., West Roxbury.
1902 Bailey, Robert M., Dedham.
1902 Baker, Clifton P., Dedham.
1901 Baker, James E., South Lincoln.
1904 Balch, Joseph, Dedham.
1909 Baldwin, Frank F., Hopkinton.
1888 Barber, J. Wesley, Newton.
1904 Barker, George, Swampscott.
1905 Barnard, George E., Ipswich.
1866 Barnes, Walter S., Boston.
1904 Barney, Arthur F., Dorchester.
1867 Barney, Levi C., Boston.
1897 Barry, John Marshall, Boston.
1893 Barry, William C., Rochester, N. Y.
1901 Bartlett, Miss Mary F., Boston.
1914 Bartol, Dr. John W., Boston.
1901 Bates, Miss Mary D., Ipswich.
1899 Baylies, Walter C., Taunton.
1914 Beal, Mrs. Boylston, Boston.
1905 Beal, Thomas P., Boston.
1891 Becker, Frederick C., Cambridge.
1876 Beckford, Daniel R., Jr., Dedham.
1894 Beebe, E. Pierson, Boston.

1890 Beebe, Franklin H., Boston.
1905 Bemis, Frank B., Beverly.
1914 Bemis, Mrs. Frank B., Beverly.
1899 Bigelow, Albert S., Cohasset.
1914 Bigelow, Charles, Brookline.
1899 Bigelow, Joseph S., Cohasset.
1899 Bigelow, Dr. William Sturgis, Boston.
1899 Black, George N., Manchester.
1885 Blake, Mrs. Arthur W., Brookline.
1914 Blake, Benjamin S., Auburndale.
1897 Blake, Edward D., Boston.
1908 Blood, Eldredge H., Cambridge.
1905 Boardman, Miss Eliza D., Boston.
1899 Boardman, T. Dennie, Manchester.
1914 Boit, Miss Elizabeth E., Wakefield.
1875 Bolles, William P., M. D., Roxbury.
1894 Bosler, Frank C., Carlisle, Penn.
1914 Bowditch, Alfred, Jamaica Plain.
1887 Bowditch, Charles P., Jamaica Plain.
1897 Bowditch, Ernest W., Milton.
1883 Bowditch, James H., Brookline.
1894 Bowditch, Nathaniel I., Framingham.
1877 Bowditch, William E., Roxbury.
1878 Bowker, William H., Boston.
1913 Brackett, C Henry B., Boston.
1912 Bradley, Charles H., Boston.
1914 Brandegee, Mrs. Edward D., Brookline.
1900 Breck, Joseph Francis, Waban.
1914 Breck, Luther Adams, Newton.
1899 Bremer, Mrs. John L., Manchester.
1871 Bresee, Albert, Hubbardton, Vt.
1914 Brewer, Edward M., Milton.
1914 Brewer, Joseph, Milton.
1905 Brewster, William, Cambridge.
1910 Briggs, Mrs. George R., Plymouth.
1897 Briggs, William S., Lincoln.
1873 Brigham, William T., Honolulu, Hawaii.
1909 Brooke, Edmund G., Jr., Providence, R. I.
1914 Brooks, Miss Fanny, Readville.
1914 Brooks, Henry G., Milton.
1899 Brooks, Peter C., Boston.
1899 Brooks, Shepherd, Boston.
1912 Brooks, Walter D., Milton.
1909 Brown, Mrs. John Carter, Providence, R. I.
1899 Brown, Samuel N., Boston.
1907 Brush, Charles N., Brookline.
1906 Buitta, Vincent, Newton Upper Falls.
1914 Bullard, Alfred M., Milton.
1897 Burlen, William H., East Holliston.
1895 Burnett, Harry, Southborough.
1911 Burnett, John T., Southborough.
1914 Burnett, Robert M., Southborough.
1914 Burnham, Miss Helen C., Boston.
1911 Burpee, W. Atlee, Philadelphia, Pa.
1909 Burr, I. Tucker, Milton.
1906 Burrage, Albert C., Boston.
1868 Butler, Aaron, Wakefield.
1907 Butterworth, George William, South Framingham.
1906 Butterworth, J. Thomas, South Framingham.
1905 Buttrick, Stedman, Concord.

1902 Cabot, George E., Boston.
1914 Cabot, Henry B., Brookline.
1870 Calder, Augustus P., Mattapan.
1896 Cameron, Robert, Cambridge.
1908 Campbell, Charles A., Ipswich.
1913 Campbell, Chester I., Wollaston.
1891 Campbell, Francis, Cambridge.

1905 Carr, Samuel, Boston.
1893 Carter, Charles N., Needham.
1867 Carter, Miss Maria E., Woburn.
1885 Cartwright, George, Dedham.
1899 Casas, W. B. de las, Malden.
1911 Case, Miss Marian Roby, Weston.
1873 Chamberlain, Chauncy W., Waban.
1909 Chamberlain, Montague, Groton.
1903 Chapman, John L., Prides Crossing.
1878 Chase, Joseph S., Malden.
1909 Chase, Philip Putnam, Milton.
1895 Cheney, Mrs. Elizabeth S., Wellesley.
1894 Christie, William, Everett.
1876 Clapp, Edward B., Dorchester.
1871 Clapp, William C., Dorchester.
1896 Clark, B. Preston, Cohasset.
1896 Clark, Miss Eleanor J., Pomfret Centre, Conn.
1907 Clark, Herbert A., Belmont.
1890 Clark, J. Warren, Millis.
1910 Clark, Winslow, Milton.
1871 Clarke, Miss Cora H., Boston.
1899 Clarke, Eliot C., Boston.
1914 Clifford, Charles P., Milton.
1895 Clough, Micajah Pratt, Lynn.
1894 Cobb, John C., Milton.
1914 Cochrane, Alexander, Boston.
1906 Codman, Miss Catherine A., Westwood.
1871 Codman, James M., Brookline.
1914 Codman, James M., Jr., Brookline.
1901 Coe, Miss Mary Alma, Boston.
1903 Cogswell, Edward R., Jr., Newton Highlands.
1900 Cole, Edward E., Boston.
1887 Collamore, Miss Helen, Boston.
1882 Collins, Frank S., North Eastham.
1900 Colton, Samuel H., Worcester.
1902 Comley, Norris F., Lexington.
1899 Converse, Col. H. E., Marion.
1913 Cook, Thomas N., Watertown.
1914 Coolidge, Charles A., Boston.
1902 Coolidge, Harold J., Boston.
1899 Coolidge, J. Randolph, Chestnut Hill.
1899 Coolidge, Mrs. J. Randolph, Chestnut Hill.
1914 Cotting, Charles E., Boston.
1914 Cotting, Mrs. Charles E., Boston.
1892 Cottle, Henry C., Boston.
1914 Councilman, Dr. W. T., Boston.
1913 Cox, Simon F., Mattapan.
1892 Cox, Thomas A., Dorchester.
1914 Crafts, Miss Elizabeth S., Boston.
1910 Craig, David R., Boston.
1901 Craig, William Nicol, Brookline.
1899 Crane, Zenas, Dalton.
1891 Crawford, Dr. Sarah M., Roxbury.
1891 Crocker, Miss Sarah H., Boston.
1914 Crompton, Miss Isabel M., Worcester.
1887 Crosby, George E., West Medford.
1914 Crosby, Mrs. S. V. R., Boston.
1901 Cross, Alfred Richard, Nantasket.
1909 Cumner, Mrs. Nellie B., Brookline.
1856 Curtis, Charles F., Jamaica Plain.
1899 Curtis, Charles P., Boston.
1895 Cushing, Livingston, Weston.
1906 Cutler, Mrs. Charles F., Boston.
1903 Cutler, Judge Samuel R., Revere.

1897 Damon, Frederick W., Arlington.
1908 Dane, Ernest B., Brookline.
1908 Dane, Mrs. Ernest B., Brookline.
1899 Daniels, Dr. Edwin A., Boston.

1909 Danielson, Mrs. J. DeForest, Boston.
1892 Davenport, Albert M., Watertown.
1902 Davis, Arthur E., Dover.
1902 Davis, Mrs. Arthur E., Dover.
1913 Davis, Bancroft Chandler, Weston.
1914 Davis, Livingston, Milton.
1909 Dawson, Henry Sargent, Jamaica Plain.
1872 Dawson, Jackson T., Jamaica Plain.
1905 Day, Henry B., West Newton.
1873 Denny, Clarence H., Boston.
1904 Dexter, Gordon, Beverly Farms.
1904 Dexter, Philip, Beverly.
1866 Dike, Charles C., Stoneham.
1902 Doane, Edgar Howard, Wenham.
1896 Donald, William, Cold Spring Harbor, N. Y.
1900 Donaldson, James, Roxbury.
1907 Doten, Scott T., Jamaica Plain.
1914 Douglass, Alfred, Brookline.
1910 Downs, William, Chestnut Hill.
1893 Dowse, William B. H., West Newton.
1899 Draper, George A., Hopedale.
1896 Dreer, William F., Philadelphia, Pa.
1897 Dumaresq, Herbert, Chestnut Hill.
1899 Duncan, James L., New York, N. Y.
1902 Duncan, John W., Spokane, Wash.
1896 Dunlap, James H., Nashua, N. H.
1909 Dupuy, Louis, Whitestone, L. I., N. Y.
1852 Durfee, George B., Fall River.
1880 Dutcher, Frank J., Hopedale.
1900 Dwight, Theodore F., Kendal Green.
1902 Dyer, Herbert H., Arlington.

1912 Eaton, Harris D., Southborough.
1911 Edgar, Mrs. Rose H., Waverley.
1912 Edgar, William Percival, Jamaica Plain.
1895 Eldredge, H. Fisher, Boston.
1887 Elliott, Mrs. John W., Boston.
1888 Elliott, William H., Brighton.
1903 Ellsworth, J. Lewis, Worcester.
1907 Emerson, Nathaniel W., M.D., Boston.
1894 Endicott, William, Jr., Boston.
1899 Endicott, William C., Danvers.
1897 Estabrook, Arthur F., Boston.
1905 Estabrook, Mrs. Arthur F., Boston.
1907 Eustis, Miss Elizabeth M., Brookline.
1907 Eustis, Miss Mary St. Barbe, Brookline.
1914 Evans, Mrs. Robert D., Boston.

1881 Fairchild, Charles, New York, N. Y.
1877 Falconer, William, Pittsburg, Pa.
1884 Farlow, Lewis H., Boston.
1896 Farnsworth, Mrs. William, Dedham.
1890 Farquhar, James F. M., Roslindale.
1891 Farquhar, John K. M. L., Roxbury.
1884 Farquhar, Robert, North Cambridge.
1873 Faxon, John, Quincy.
1899 Fay, H. H., Woods Hole.
1908 Fay, Wilton B., West Medford.
1914 Fearing, George R., Jr., Boston.
1899 Fessenden, George B., Allston.
1883 Fewkes, Arthur H., Newton Highlands.
1904 Finlayson, Duncan, Jamaica Plain.

1892 Finlayson, Kenneth, Jamaica Plain.
1901 Fisher, Peter, Ellis.
1910 Flanagan, Joseph F., Newton.
1882 Fletcher, George V., Belmont.
1883 Fletcher, J. Henry, Belmont.
1914 Forbes, Alexander, M.D., Milton.
1909 Forbes, Charles Stewart, Boston.
1909 Forbes, Mrs. J. Malcolm, Milton.
1914 Forbes, W. Cameron, Westwood.
1909 Forbes, Mrs. William H., Milton.
1914 Foster, Alfred D., Milton.
1899 Foster, Charles H. W., Needham.
1883 Foster, Francis C., Cambridge.
1885 Fottler, John, Jr., Dorchester.
1881 Fowle, George W., Jamaica Plain.
1914 Fraser, Charles E. K., South Natick.
1911 Freeman, Mrs. James G., Boston.
1910 French, Mrs. Albert M., Reading.
1892 French, S. Waldo, Newtonville.
1893 French, W. Clifford, Brookline.
1882 Frohock, Roscoe R., Boston.
1903 Frost, Harold L., Arlington.
1900 Frost, Irving B., Belmont.

1910 Galloupe, Frederic R., Lexington.
1914 Gannett, Samuel, Milton.
1914 Gardiner, Robert H., Gardiner, Maine.
1901 Gardner, Mrs. Augustus P., Hamilton.
1895 Gardner, George A., Boston.
1895 Gardner, George P., Boston.
1899 Gardner, John L., Boston.
1899 Gardner, Mrs. John L., Brookline.
1899 Gardner, William Amory, Groton.
1904 Garratt, Allan V., Holliston.
1899 Gaston, William A., Boston.
1911 Gavin, Frank D., Manchester
1910 Geiger, Albert, Jr., Brookline.
1911 Gill, Miss Adeline Bradbury, Medford.
1911 Gill, Miss Eliza M., Medford.
1865 Gill, Mrs. E. M., Medford.
1887 Gill, George B., Medford.
1870 Gilson, F. Howard, Wellesley Hills.
1907 Goddard, Samuel J., Framingham.
1904 Goodale, Dr. Joseph L., Boston.
1885 Goodell, L. W., Dwight.
1892 Gowing, Mrs. Clara E., Kendal Green.
1899 Gray, Mrs. John C., Boston.
1910 Green, Mrs. Francis Cushing, Buzzards Bay.
1914 Greene, Edwin Farnham, Boston.
1905 Greenough, Mrs. Charles P., Brookline.
1912 Greenough, Mrs. David S., Jamaica Plain.
1899 Grew, Edward S., Boston.
1914 Grew, Mrs. Edward S., Boston.
1914 Grew, Edward W., Boston.

1897 Hale, James O., Byfield.
1873 Hall, Edwin A., Cambridgeport.
1912 Hall, Mrs. George G., Boston.
1899 Hall, Jackson E., Foxboro.
1897 Hall, Osborn B., Malden.
1910 Halloran, Edward J., Roxbury.
1913 Handler, Max Paul, South Natick.
1914 Harding, Charles L., Dedham.
1863 Harding, George W., Arlington.
1869 Harding, Louis B., Chestnut Hill.
1871 Hardy, F. D., Cambridgeport.
1905 Hardy, Miss Susan White, Boston.
1889 Hargraves, William J., Jamaica Plain.

1887 Harris, Thaddeus William, A. M., Littleton, N. H.
1910 Harris, Prof. William Fenwick, Cambridge.
1909 Hart, Francis R., Milton.
1914 Hartt, Arthur W., Brookline.
1899 Hartshorn, Arthur E., Worcester.
1895 Harwood, George Fred, Newton.
1884 Hastings, Levi W., Brookline.
1906 Hauthaway, Edwin D., Sharon.
1914 Havemeyer, Theodore A., New York, N. Y.
1891 Hawken, Mrs. Thomas, Rockland, Me.
1899 Hayward, George P., Chestnut Hill.
1914 Haywood, H. T., Franklin.
1905 Head, Thomas W., Bergenfield, N. J.
1913 Heeremans, F., Lenox.
1903 Hellier, Charles E., Boston.
1888 Hemenway, Augustus, Canton.
1899 Hemenway, Mrs. Augustus, Canton.
1914 Hemenway, Augustus, Jr., Boston.
1884 Henshaw, Joseph P. B., Boston.
1899 Henshaw, Samuel, Cambridge.
1901 Heurlin, Julius, South Braintree.
1894 Hewett, Miss Mary C., Cambridge.
1900 Higginson, Francis L., Boston.
1902 Higginson, Mrs. Henry L., Boston.
1866 Hilbourn, A. J., Boston.
1886 Hittinger, Jacob, Belmont.
1911 Hittinger, Richard, Belmont.
1895 Hoitt, Hon. Charles W., Nashua, N. H.
1905 Holbrook, E. Everett, Boston.
1914 Hollingsworth, Valentine, Boston.
1899 Hollingsworth, Z. T., Boston.
1881 Hollis, George W., Allston.
1891 Holmes, Edward J., Boston.
1876 Holt, Mrs. Stephen A., Cambridge.
1900 Holt, William W., Norway, Maine.
1899 Hood, The Hon. Mrs. Ellen, Sheen, Surrey, Eng.
1899 Hooper, William, Manchester.
1913 Hopewell, John, Newton.
1914 Hornblower, Henry, Boston.
1888 Horsford, Miss Kate, Cambridge.
1912 Horton, Arthur E., Lexington.
1902 Hosmer, Oscar, Wenham.
1907 Houghton, Clement S., Chestnut Hill.
1910 Houghton, Miss Elizabeth G., Boston.
1872 Hovey, Charles H., South Pasadena, Cal.
1884 Hovey, Stillman S., Woburn.
1904 Howard, Henry M., West Newton.
1896 Howard, Joseph W., Somerville.
1905 Hoyt, William J., Manchester. N. H.
1896 Hubbard, Charles Wells, Weston.
1865 Hubbard, James C., Everett.
1913 Huebner, H., Groton.
1875 Humphrey, George W., Dedham.
1912 Hunnewell, F. W., 2d., Wellesley.
1893 Hunnewell, Henry Sargent, Wellesley.
1912 Hunnewell, Mrs. Henry S., Wellesley.
1882 Hunnewell, Walter, Wellesley.
1912 Hunnewell, Walter, Jr., Wellesley.
1892 Hunt, Dudley F., Reading.
1866 Hunt, Franklin, Charlestown, N. H.
1880 Hunt, William H., Concord.
1904 Hutchins, Rev. Charles Lewis, Concord.

1893 Jack, John George, East Walpole.
1886 Jackson, Charles L., Boston.
1914 Jackson, Mrs. James, Jr., Westwood.
1884 Jackson, Robert T., Cambridge.
1902 James, Ellerton, Milton.
1902 James, Mrs. Ellerton, Milton.
1899 James, George Abbot, Nahant.
1910 Jaques, Herbert, Chestnut Hill.
1913 Jeffries, John Temple L., Cambridge.
1899 Jeffries, William A., Boston.
1865 Jenks, Charles W., Bedford.
1905 Johnson, Arthur S., Boston.
1914 Johnson, Edward C., Boston.
1885 Johnson, J. Frank, Malden.
1907 Jones, Mrs. Clarence W., Brookline.
1896 Jones, Jerome, Brookline.
1897 Jones, Dr. Mary E., Boston.
1899 Jordan, Eben D., Boston.
1900 Jordan, Henry G., Brookline.

1897 Kellen, William V., Marion.
1886 Kelly, George B., Jamaica Plain.
1848 Kendall, D. S., Woodstock, Ont.
1868 Kendall, Edward, Cambridgeport.
1891 Kendall, Dr. Walter G., Atlantic.
1868 Kennedy, George G., M. D., Milton.
1909 Kennedy, Harris, M. D., Milton.
1905 Keyes, Mrs. Emma Mayer, New York.
1891 Keyes, John M., Concord.
1889 Kidder, Charles A., Southborough.
1910 Kidder, Mrs. Henry P., Boston.
1880 Kidder, Nathaniel T., Milton.
1899 Kimball, David P., Boston.
1903 Kimball, Richard D., Waban.
1899 King, D. Webster, Boston.
1865 Kingman, Abner A., Wakefield.
1899 Kinney, H. R., Worcester.
1906 Kinnicutt, Mrs. Leonard P., Worcester.
1904 Kirkland, Archie Howard, Reading.

1899 Lamb, Horatio A., Milton.
1913 Lancaster, Dr. Walter B., Brookline.
1899 Lanier, Charles, Lenox.
1895 Lawrence, Amos A., New York, N. Y.
1873 Lawrence, John, Groton.
1899 Lawrence, Rt. Rev. William, Boston.
1895 Lee, Daniel D., Jamaica Plain.
1914 Lee, George C., Westwood.
1914 Lee, Mrs. George C., Westwood.
1880 Leeson, Hon. Joseph R., Newton Centre.
1902 Leighton, George B., Monadnock, N. H.
1914 Leland, Lester, Boston.
1914 Leland, Mrs. Lester, Boston.
1871 Lemme, Frederick, Charlestown.
1903 Libby, Charles W., Medford.
1904 Lindsey, N. Allen, Marblehead.
1899 Little, John Mason, Swampscott.
1899 Locke, Isaac H., Belmont.
1891 Lodge, Richard W., Redlands, Cal.
1897 Loomis, Elihu G., Bedford.
1899 Loring, Augustus P., Beverly.
1905 Loring, David, Boston.
1914 Loring, Miss Katherine P., Prides Crossing.
1914 Loring, Miss Louisa P., Prides Crossing.
1899 Loring, Mrs. William Caleb, Beverly.
1899 Lowell, Abbott Lawrence, Boston.
1902 Lowell, Miss Amy, Brookline.

1903 Lowell, James A., Chestnut Hill.
1903 Lowell, John, Newton.
1904 Lowell, Miss Lucy, Boston.
1899 Luke, Otis H., Brookline.
1895 Lunt, William W., Hingham.
1914 Lyman, Arthur T., Boston.
1914 Lyman, C. Frederic, Boston.
1895 Lyman, George H., Wareham.

1898 Mabbett, George, Plymouth.
1912 McKay, Alexander, Jamaica Plain.
1911 McKenzie, Donald, Chestnut Hill.
1900 Mackie, George, M. D., Attleboro.
1868 Mahoney, John, Boston.
1892 Mallett, E. B., Jr. Freeport, Me.
1884 Manda, W. A., South Orange, N. J.
1906 Mandell, Mrs. William D., Boston.
1873 Mann, James F., Ipswich.
1887 Manning, J. Woodward, North Wilmington.
1884 Manning, Warren H., Brookline.
1903 Marble, Benjamin C., Manchester.
1909 Marlborough, James, Topsfield.
1913 Marshall, A. A., Fitchburg.
1876 Marshall, Frederick F., Everett.
1898 Marston, Howard, Brookline.
1899 Mason, Miss Ellen F., Boston.
1896 Mason, Col. Frederick, Taunton.
1914 Mathews, Miss Elizabeth Ashby, Newton Center.
1901 Matthews, Nathan, Boston.
1906 Maxwell, George H., Newton.
1902 Melvin, George, South Framingham.
1885 Melvin, James C., Boston.
1905 Meredith, J. Morris, Topsfield.
1907 Merriam, Charles, Weston.
1881 Merriam, Herbert, Weston.
1884 Metivier, James, Waltham.
1914 Meyer, George von L., Hamilton.
1914 Mifflin, George H., Boston.
1914 Miller, Peter M., Mattapan.
1888 Milmore, Mrs. Joseph, Washington, D. C.
1908 Minot, Laurence, Boston.
1892 Monteith, David, Hyde Park, Vt.
1896 Montgomery, Alexander, Natick.
1902 Montgomery, Alexander, Jr., Natick.
1896 Moore, George D., Arlington.
1881 Moore, John H., Concord.
1897 Morgan, George H., New York, N. Y.
1914 Morgan, Mrs. J. P., New York, N. Y.
1913 Morison, Robert S., Cambridge.
1912 Morris, George E., Waltham.
1899 Morse, John T., Boston.
1909 Morse, John Torrey, 3d., Boston.
1910 Morse, Lewis Kennedy, Boxford.
1913 Morse, Robert C., Milton.
1900 Morse, Robert M., Jamaica Plain.
1914 Morss, Charles A., Chestnut Hill.
1914 Morss, Mrs. Charles A., Chestnut Hill.
1902 Morton, James H., Mattapan.
1896 Moseley, Charles H., Roxbury.
1909 Moseley, Charles W., Newburyport.
1896 Moseley, Frederick Strong, Newburyport.
1914 Munroe, Howard M., Lexington.
1900 Murray, Peter, Fairhaven.
1897 Mutch, John, Waban.

1899 Nevins, Mrs. David, Methuen.
1914 Newbold, Frederic R., New York, N. Y.
1874 Newman, John R., Winchester.
1874 Newton, Rev. William W., Pittsfield.
1914 Nicholson, William R., Framingham.
1906 Nickerson, William E., Cambridge.
1914 Norman, Mrs. Louisa P., Newport, R. I.
1881 Norton, Charles W., Allston.
1891 Norton, Edward E., Boston.
1869 Norton, Patrick, Dorchester.

1912 O'Conner, John, Brookline.
1898 Olmsted, Frederick Law, Jr., Brookline.
1892 Olmsted, John C., Brookline.
1898 Orpet, Edward O., Lake Forest, Ill.

1909 Page, George, Newton Highlands.
1909 Page, George William, East Billerica.
1900 Page, Mrs. Henrietta, Cambridge.
1884 Paige, Clifton H., Mattapan.
1914 Paine, Robert Treat, 2d, Boston.
1908 Parker, Augustine H., Dover.
1891 Parker, Charles W., Boston.
1913 Parker, Edgar, North Easton.
1911 Parker, Edward, North Easton.
1891 Parkman, Henry, Boston.
1899 Parsons, John E., Lenox.
1914 Patten, Miss Jane B., South Natick.
1897 Patten, Marcellus A., Tewksbury.
1909 Peabody, Francis, Milton.
1909 Peabody, Mrs. Francis, Milton.
1905 Peabody, Frank E., Boston.
1899 Peabody, George A., Danvers.
1881 Peabody, John E., Salem.
1871 Peck, William G., Arlington.
1907 Perce, E. Allan, Waltham.
1914 Peirson, Charles Lawrence, Boston.
1899 Pentecost, Mrs. Ernest Harvey, Topsfield.
1873 Perry, George W., Malden.
1904 Perry, Oliver Hazard, Lowell.
1899 Pfaff, Col. Charles, South Framingham.
1900 Phillips, John C., North Beverly.
1899 Phillips, Mrs. John C., North Beverly.
1899 Phillips, William, North Beverly.
1895 Pickman, Dudley L., Boston.
1902 Pickman, Mrs. Ellen R., Boston.
1881 Pierce, Dean, Brookline.
1892 Pierce, George Francis, Neponset.
1905 Pierce, Wallace L., Boston.
1905 Pierson, Frank R., Tarrytown, N. Y.
1914 Pingree, David, Salem.
1900 Pond, Preston, Winchester.
1899 Porter, Alexander S., Boston.
1892 Porter, James C., Wollaston.
1884 Pratt, Laban, Dorchester.
1868 Pratt, Robert M., Boston.
1914 Pratt, Waldo E., Wellesley Hills.
1898 Pray, James Sturgis, Cambridge.
1858 Prescott, Eben C., New York, N. Y.
1914 Preston, Andrew W., Swampscott.
1903 Preston, Howard Willis, Providence, R. I.
1911 Priest, Lyman F., Gleasondale.
1912 Proctor, Henry H., Boston.
1901 Proctor, Thomas E., Boston.
1899 Putnam, George, Manchester.
1900 Putnam, George J., Brookline.

1886 Quinby, Hosea M., M. D., Worcester.

1891 Raddin, Everett W., North Cambridge.
1889 Rand, Harry S., North Cambridge.
1908 Rand, Miss Margaret A., Cambridge.
1903 Rawson, Herbert W., Arlington.
1882 Ray, James F., Franklin.
1890 Raymond, Walter, Pasadena, Cal.
1891 Read, Charles A., Manchester.
1902 Reardon, Edmund, Cambridgeport.
1892 Reardon, John B., Boston.
1912 Reiff, William, Forest Hills.
1905 Remick, Frank W., West Newton.
1889 Rice, George C., Worcester.
1887 Rich, William P., Chelsea.
1876 Richards, John J., Brookline.
1899 Richardson, Mrs. F. L. W., Charles River Village.
1912 Richardson, H. H., Brookline.
1900 Richardson, Dr. William L., Boston.
1905 Riggs, William Allan, Auburndale.
1886 Ripley, Charles, Dorchester.
1892 Ripley, Ebed L., Hingham Centre.
1903 Robb, Russell, Concord.
1909 Roberts, Miss Anna B., Boston.
1909 Robinson, Alfred E., Lexington.
1871 Robinson, John, Salem.
1900 Rodman, Miss Mary, Concord.
1903 Roffe, Albert H., Newton Centre.
1911 Rogers, Dexter M., Allston.
1914 Rogers, Dudley P., Danvers.
1899 Rogers, Mrs. Jacob C., Peabody.
1900 Roland, Thomas, Nahant.
1910 Ross, Harold S., Hingham.
1895 Rothwell, James E., Brookline.
1899 Roy, David Frank, Marion.
1881 Ruddick, William H., M. D., South Boston.
1875 Russell, George, Woburn.
1914 Russell, Mrs. Henry S., Boston.
1900 Russell, James S., Milton.
1914 Russell, Mrs. Robert S., Boston.

1893 Salisbury, William C. G., Brookline.
1912 Saltonstall, John L., Beverly.
1912 Saltonstall, Mrs. John L., Beverly.
1899 Saltonstall, Richard M., Chestnut Hill.
1898 Sanger, Mrs. George P., Boston.
1900 Sargent, Andrew Robeson, Brookline.
1870 Sargent, Charles S., Brookline.
1899 Sargent, Mrs. Charles S., Brookline.
1902 Sargent, Charles Sprague, Jr., Brookline.
1899 Sargent, Mrs. Francis W., Wellesley.
1896 Scorgie, James C., Cambridge.
1864 Scott, Charles, Newton.
1895 Sears, Miss Clara E., Boston.
1899 Sears, Dr. Henry F., Boston.
1914 Sears, Horace S., Weston.
1899 Sears, Mrs. J. Montgomery, Boston.
1898 Sharp, Miss Helen, Boston.
1914 Shattuck, Dr. Frederick C., Boston.
1914 Shattuck, Mrs. Frederick C., Boston.
1899 Shaw, Francis, Wayland.
1914 Shaw, Henry S., Milton.
1899 Shaw, Mrs. Robert G., Wellesley.
1901 Shea, James B., Jamaica Plain.
1906 Sherman, J. P. R., Newton.

1865 Shorey, John L., Lynn.
1892 Shuman, Hon. A., Boston.
1901 Shurtleff, Josiah B., Jr., Revere.
1893 Siebrecht, H. A., New Rochelle, N. Y.
1899 Sleeper, Henry Davis, Boston.
1903 Smiley, Daniel, Lake Mohonk, N. Y.
1888 Smith, Charles S., Lincoln.
1872 Smith, Edward N., San Francisco, Cal.
1911 Smith, John L., Swampscott.
1888 Smith, Thomas Page, Waltham.
1874 Snow, Eugene A., Cambridge.
1899 Sohier, Col. William D., Beverly.
1864 Spaulding, Edward, Weston.
1908 Spaulding, John T., Prides Crossing.
1908 Spaulding, William S., Prides Crossing.
1897 Sprague, Isaac, Wellesley Hills.
1884 Stearns, Charles H., Brookline.
1893 Stearns, Frank W., Newton.
1896 Stedman, Henry R., M. D., Brookline.
1914 Stevens, Mrs. Nathaniel, North Andover.
1885 Stewart, William J., Winchester.
1901 Stone, Charles A., Newton.
1889 Stone, Charles W., Boston.
1910 Stone, Mrs. Francis H., New Bedford.
1914 Stone, Galen L., Brookline.
1896 Stone, Prof. George E., Amherst.
1849 Stone, George F., Chestnut Hill.
1914 Stone, J. Winthrop, Watertown.
1914 Stone, Nathaniel H., Milton.
1905 Storrow, James J., Boston.
1905 Stratton, Charles E., Boston.
1906 Strout, Charles S., Biddeford, Me.
1914 Sturgis, Miss Evelyn R., Manchester.
1902 Sturgis, Richard Clipston, Boston.
1910 Sullivan, Martin, Jamaica Plain.
1912 Swan, Charles H., Jamaica Plain.
1891 Sweet, Everell F., Malden.
1904 Sylvester, Edmund Q., Hanover.

1899 Taylor, Charles H., Boston.
1913 Tedcastle, Mrs. Arthur W., Hyde Park.
1896 Tenney, Charles H., Methuen.
1912 Thatcher, Arthur E., Bar Harbor, Me.
1898 Thatcher, William, Brookline.
1899 Thayer, Mrs. Alice R., Boston.
1900 Thayer, Bayard, South Lancaster.
1900 Thayer, Mrs. Bayard, South Lancaster.
1899 Thayer, Mrs. Eugene V. R., South Lancaster.
1903 Thayer, Henry J., Boston.
1899 Thayer, John E., South Lancaster.
1899 Thayer, Mrs. John E., South Lancaster.
1899 Thayer, Mrs. Nathaniel, Lancaster.
1899 Thiemann, Hermann, Owosso, Mich.
1899 Thomas, W. B., Manchester.
1910 Thurlow, George C., West Newbury.
1913 Thurlow, Winthrop H., West Newbury.
1874 Tolman, Miss Harriet S., Boston.
1896 Toppan, Roland W., Malden.
1864 Torrey, Everett, Charlestown.
1899 Tower, Miss Ellen May, Lexington.
1901 Tower, Mrs. Helen M., Cambridge.

1914 Towle, L. D., Newton.
1893 Trepess, Samuel J., Glencove, L. I., N. Y.
1910 Turner, Chester Bidwell, Roxbury.
1914 Tyler, Charles H., Boston.

1910 Underwood, Henry O., Belmont.
1901 Underwood, Loring, Belmont.

1873 Vander-Woerd, Charles, Waltham.
1899 Vaughan, William Warren, Boston.
1884 Vinal, Miss Mary L., Somerville.

1909 Wainwright, Arthur, Milton.
1849 Wakefield, E. H., Cambridge.
1876 Walcott, Henry P., M. D., Cambridge.
1895 Waldo, C. Sidney, Jamaica Plain.
1914 Walker, William B., Manchester.
1896 Walsh, Michael H., Woods Hole.
1901 Waltham, George C., Dorchester.
1907 Walton, Arthur G., Wakefield.
1902 Warburton, Chatterton, Fall River.
1912 Wardwell, Mrs. T. Otis, Haverhill.
1894 Ware, Miss Mary L., Boston.
1909 Warren, Bentley W., Boston.
1889 Watson, Benjamin M., Jamaica Plain.
1884 Watson, Thomas A., East Braintree.
1914 Watters, W. F., Boston.
1905 Webster, Edwin S., Chestnut Hill.
1914 Webster, Mrs. Edwin S., Chestnut Hill.
1905 Webster, Frank G., Boston.
1907 Webster, George H., Haverhill.
1896 Webster, Hollis, Cambridge.
1905 Webster, Laurence J., Holderness, N. H.
1909 Weeks, Andrew Gray, Marion.
1901 Welch, David, Dorchester.
1902 Welch, Edward J., Dorchester.
1914 Weld, Mrs. Charles G., Brookline.
1884 Weld, Christopher Minot, Readville.
1899 Weld, Gen. Stephen M., Wareham.
1914 Weld, Mrs. Stephen M., Wareham.
1912 Wellington, Mrs. Arthur W., Boston.
1882 West, Mrs. Maria L., Neponset.
1887 Wheeler, Frank, Concord.
1889 Wheeler, James, Natick.
1897 Wheeler, Wilfrid, Concord.
1865 Whitcomb, William B., Medford.
1901 White, Mrs. Charles T., Boston.
1865 White, Francis A., Brookline.
1899 White, George R., Boston.
1909 White, Harry K., Milton.
1888 White, Joseph H., Brookline.
1905 Whitman, William, Brookline.
1894 Whitney, Arthur E., Winchester.
1894 Whitney, Ellerton P., Milton.
1899 Whitney, Henry M., Cohasset.
1899 Wigglesworth, George, Milton.
1863 Wilbur, George B., Boston.
1889 Wilde, Mrs. Albion D., West Roxbury.
1881 Wilder, Edward Baker, Dorchester.
1899 Williams, Miss Adelia Coffin, Roxbury.
1905 Williams, George Percy, Boston.
1899 Williams, John Davis, Boston.

1905 Williams, Mrs. J. Bertram, Cambridge.
1905 Williams, Mrs. Moses, Brookline.
1871 Williams, Philander, Taunton.
1911 Williams, Ralph B., Dover.
1914 Wilson, Fred A., Nahant.
1881 Wilson, William Power, Boston.
1905 Winsor, Robert, Weston.
1906 Winter, Herman L., Seabrook, N. H.
1914 Winthrop, Greenville L., Lenox.
1914 Winthrop, Mrs. Robert, New York, N. Y.
1914 Winthrop, Mrs. Robert C., Jr., Boston.
1870 Wood, William K., Franklin.
1905 Woodberry, Miss E. Gertrude, North Cambridge.
1905 Woodbury, John, Canton.
1906 Woodward, Mrs. Samuel Bayard, Worcester.
1900 Wyman, Windsor H., North Abington.

ANNUAL MEMBERS.

1913 Adams, Charles F., Jamaica Plain.
1905 Allen, Mrs. Sallie R., Wilmington.
1896 Anderson, George M., Milton.

1912 Babcock, Miss Mabel Keyes, Wellesley Hills.
1911 Bacon, Augustus, Roxbury.
1865 Barker, John G., South Bend, Ind.
1898 Barr, John, South Natick.
1893 Bigelow, Mrs. Nancy J., Southborough.
1867 Bird, John L., Dorchester.
1909 Blanchard, Herbert W., Concord.
1904 Borst, Theodore F., South Framingham.
1901 Bradley, Miss Abby A., Hingham.
1913 Bradley, Miss Julia H., Roxbury.
1873 Breck, Charles H., Newton.
1902 Breed, Edward W., Clinton.
1908 Briggs, Frank P., Ayer.
1909 Brigham, Mrs. Clifford, Milton.
1914 Brown, F. Howard, Marlboro.
1908 Butler, E. K., Jamaica Plain.

1914 Campbell, Ernest W., Wollaston.
1910 Camus, Emil, Boston.
1904 Chandler, Alfred D., Brookline.
1910 Churchill, Charles E., Rockland.
1912 Clark, Mrs. Herbert L., Reading.
1914 Collins, William J., Brookline.
1914 Colt, James D., Chestnut Hill.
1907 Colt, Mrs. James D., Chestnut Hill.
1914 Crocker, Mrs. George Glover, Boston.
1914 Crocker, Joseph Ballard, Chatham.
1914 Crompton, Miss Mary A., Worcester.
1881 Crosby, J. Allen, Jamaica Plain.
1875 Curtis, Joseph H., Boston.
1914 Cushing, Mrs. Harvey, Brookline.
1912 Cutler, Mrs. N. P., Newton.
1906 Cutting, Mrs. Isabelle Ladd, Roxbury.

1910 Dahl, Frederick William, Roxbury.
1889 Davis, Frederick S., West Roxbury.
1914 Deland, Mrs. Margaret, Boston.
1911 Dolansky, Frank J., Lynn.
1897 Dorr, George B., Boston.

1903 Evans, Frank H., Malden.

1902 Farlow, Mrs. William G., Cambridge.
1901 Fiske, Harry E., Wollaston.
1894 Fitzgerald, Desmond, Brookline.
1885 Forbes, William H., Jamaica Plain.
1903 Freeman, Miss Harriet E., Boston.
1905 Fuld, Maurice, New York, N.Y.

1912 Gage, L. Merton, Groton.

1902 Garthly, James, Fairhaven.
1912 Goodwin, Mrs. Daniel, East Greenwich, R. I.
1900 Grey, Robert Melrose, Belmont, Cuba.
1897 Grey, Thomas J., Chelsea.

1907 Hall, Harry F., Moorestown, N. J.
1908 Hamilton, Mrs. George Langford, Magnolia.
1910 Handley, A. H., Newton.
1912 Hardy, John H., Jr., Littleton.
1912 Hartshorn, William N., Boston.
1894 Hatfield, T. D., Wellesley.
1910 Hayward, Mrs. W. E., Ipswich.
1891 Heustis, Warren H., Belmont.
1914 Higginson, Mrs. Alexander H., Manchester.
1902 Hildreth, Miss Ella F., Westford.
1902 Hill, Arthur Dehon, Boston.
1884 Hill, J. Willard, Belmont.
1912 Hollingsworth, Mrs. Sumner, Boston.
1913 Holmes, Eber, Montrose.
1913 Houghton, Mrs. Clement S., Chestnut Hill.
1900 Howden, Thomas, Prides Crossing.
1902 Hubbard, Allen, Newton Centre.
1893 Hubbard, F. Tracy, Cambridge.

1869 Jameson, G. W., East Lexington.
1913 Jenkins, Edwin, Lenox.
1903 Johnston, Robert, Lexington.

1894 Keith, Mrs. Mary R., Washington, D. C.
1898 Kelsey, Harlan P., Salem.
1898 Kennard, Frederic H., Newton Centre.
1912 Kirkegaard, John, Bedford.

1889 Lancaster, Mrs. E. M., Roxbury.
1900 Lawson, Joshua, Brookline.
1914 Leach, C. Arthur, South Hamilton.
1914 Leary, Dr. Timothy, Jamaica Plain.
1904 Leuthy, A., Roslindale.
1902 Lewis, E. L., Taunton.
1896 Lincoln, Miss Agnes W., Medford.
1914 Longyear, Mrs. Mary Beecher, Brookline.
1901 Loring, Mrs. Thacher, Boston.
1896 Loring, William C., Beverly.
1903 Lumsden, David, Ithaca, N. Y.

1912 McCarthy, Nicholas F., South Boston.
1914 McGregor, Alexander, Malden.
1904 MacMulkin, Edward, Boston.
1890 Manning, A. Chandler, Wilmington.
1914 Morse, Frank E., Auburndale.
1913 Murray, Peter, Manomet.

1895 Nicholson, William, Framingham.
1904 Nicol, James, Quincy.
1903 Nixon, J. Arthur, Taunton.

1913 O'Brien, Mrs. Edward F., Brookline.

1914 Parker, Miss Charlotte E., Ipswich.
1906 Parker, Eliab, Roxbury.
1892 Parker, Walter S., Reading.
1909 Parker, W. Prentiss, Roxbury.
1908 Peabody, Mrs. W. Rodman, Readville.
1914 Pembroke, A. A., Beverly.
1898 Pierce, Mrs. F. A., Brookline.
1902 Pritchard, John, Bedford Hills, N. Y.

1912 Proctor, Dr. Francis I., Wellesley.
1883 Purdie, George A., Wellesley Hills.
1913 Putnam, Frank P., North Tewksbury.

1906 Rane, Prof. F. W., Waban.
1897 Rea, Frederic J., Norwood.
1912 Reed, H. B., South Weymouth.
1914 Rees, Ralph W., Amherst.
1893 Rich, Miss Ruth G., Dorchester.
1888 Rich, William E. C., Ocean Park, Maine.
1900 Robb, Peter B., Whitinsville.
1893 Robinson, Walter A., Arlington.
1879 Ross, Charles W., Newtonville.
1892 Ross, Henry Wilson, Newtonville.
1903 Ross, Walter D., Worcester.
1909 Russell, Charles F., Weston.
1910 Rust, William C., Brookline.

1907 Sanborn, Edward W., Boston.
1897 Sander, Charles J., Brookline.
1875 Saunders, Miss Mary T., Salem.
1871 Scott, Augustus E., Lexington.
1896 Searles, E. F., Methuen.
1910 Sears, Prof. F. C., Amherst.
1907 Seaver, Robert, Jamaica Plain.
1886 Sharples, Stephen P., Cambridge.
1907 Sim, William, Cliftondale.
1910 Smith, D. Roy, Boston.
1914 Smith, George N., Wellesley Hills.
1914 Spaulding, Mrs. Samuel S., Springfield Center, N. Y.
1914 Sprague, George H., Ipswich.
1914 Stevenson, Robert H., Readville.
1914 Storey, Mrs. Richard C., Boston.
1914 Sturgis, Miss Lucy Codman, Boston.
1904 Symmes, Samuel S., Winchester.

1869 Tailby, Joseph, Wellesley.
1914 Thayer, John E., Jr., Lancaster.
1909 Tracy, B. Hammond, Wenham.
1913 Tuckerman, Bayard, New York, N. Y.
1907 Turner, Everett P., Arlington.
1892 Tyndale, Theodore H., Boston.

1911 Ufford, Charles A., Dorchester.
1911 Unverhau, Heinrich, Marblehead.

1881 Vaughan, J. C., Chicago, Ill.

1902 Ware, Horace E., Milton.
1914 Washburn, Paul, Boston.
1914 Waterer, Anthony, 3d, Philadelphia, Pa.
1914 Waterer, Hosea, Philadelphia. Pa.
1903 Waugh, Prof. F. A., Amherst.
1889 Welch, Patrick, Dorchester.
1893 Westwood, Thomas H., Jamaica Plain.
1909 Wheeler, George F., Concord.
1897 Wheeler, Henry A., Newtonville.
1907 Whipple, Frank L., Lynn.
1905 White, Miss Margaret, Cambridge.
1901 Wilder, Miss Grace S., Dorchester.
1897 Wilkie, Edward A., Newtonville.
1913 Williams, Mrs. Emile F., Cambridge.
1889 Winter, William C., Mansfield.
1913 Wood, Mrs. Charles, New Bedford.

635.079
M4
H8t

TRANSACTIONS

GENERAL LIBRARY
AUG 16

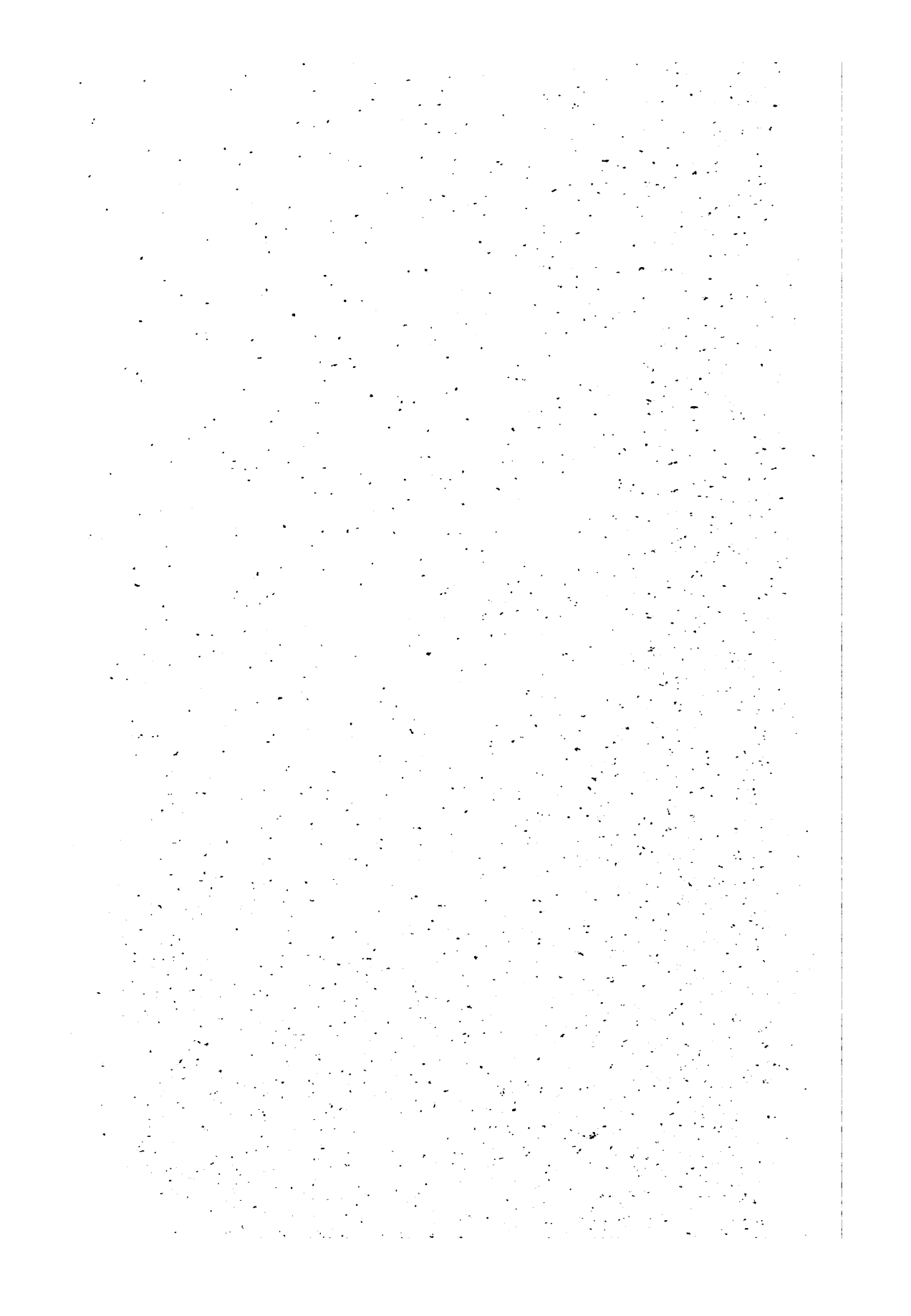
OF THE

MASSACHUSETTS HORTICULTURAL SOCIETY

FOR THE YEAR 1915

PART I

PUBLISHED BY THE SOCIETY
BOSTON
NINETEEN HUNDRED AND FIFTEEN



TRANSACTIONS

OF THE

Massachusetts Horticultural Society

FOR THE YEAR 1915

PART I

BOSTON
PRINTED FOR THE SOCIETY
NINETEEN HUNDRED AND FIFTEEN

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1915.

President.

JOHN K. M. L. FARQUHAR, of Boston.

Vice-Presidents.

WALTER HUNNEWELL, of Boston.
RICHARD M. SALTONSTALL, of Chestnut Hill.

Treasurer.

WALTER HUNNEWELL, of Boston.

Secretary.

WILLIAM P. RICH, of Chelsea.*

Trustees.

THOMAS ALLEN, of Boston.
F. LOTHROP AMES, of North Easton
ERNEST B. DANE, of Brookline.
WILLIAM DOWNS, of Chestnut Hill
WILLIAM C. ENDICOTT, of Danvers.
ARTHUR F. ESTABROOK, of Boston.
NATHANIEL T. KIDDER, of Milton.
†CHARLES W. PARKER, of Boston.
THOMAS ROLAND, of Nahant.
CHARLES S. SARGENT, of Brookline.
STEPHEN M. WELD, of Wareham.
WILFRID WHEELER, of Concord.
EDWARD B. WILDER, of Dorchester.

Nominating Committee.

DAVID R. CRAIG, of Boston.
RICHARD HITTINGER, of Belmont.
HENRY M. HOWARD, of West Newton.
GEORGE PAGE, of Newton Highlands.
JOHN L. SMITH, of Swampscott.

---

* Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

† Died January 24, 1915.

COMMITTEES FOR 1915.

Finance Committee.

WALTER HUNNEWELL, *Chairman.*
ARTHUR F. ESTABROOK, STEPHEN M. WELD.

Membership Committee.

JOHN K. M. L. FARQUHAR, WALTER HUNNEWELL,
RICHARD M. SALTONSTALL.

Committee on Prizes and Exhibitions.

JAMES WHEELER, *Chairman.*
DUNCAN FINLAYSON, PETER FISHER, S. J. GODDARD,
T. D. HATFIELD, DR. W. G. KENDALL,
EDWIN JENKINS, EDWARD B. WILDER.

Committee on Plants and Flowers.

T. D. HATFIELD, *Chairman.*
ARTHUR H. FEWKES, DONALD McKENZIE,
JAMES MARLBOROUGH, WILLIAM NICHOLSON,
WILLIAM SIM.

Committee on Fruits.

EDWARD B. WILDER, *Chairman.*
WILLIAM DOWNS, RALPH W. REES, HAROLD L. FROST.

Committee on Vegetables.

DUNCAN FINLAYSON, *Chairman.*
WILLIAM N. CRAIG, HENRY M. HOWARD,
RICHARD HITTINGER, JOHN L. SMITH.

Committee on Gardens.

JOHN K. M. L. FARQUHAR, *Chairman.*
ROBERT CAMERON, DAVID R. CRAIG, JACKSON T. DAWSON,
WILLIAM DOWNS, ARTHUR H. FEWKES, T. D. HATFIELD.

Committee on Library.

CHARLES S. SARGENT, *Chairman.*
ERNEST B. DANE, NATHANIEL T. KIDDER,
WILLIAM P. RICH.

Committee on Lectures and Publications.

WILFRID WHEELER, *Chairman.*
GEORGE B. DORR, F. C. SEARS,
FRED A. WILSON.

Committee on Children's Gardens.

HENRY S. ADAMS, *Chairman.*
PHILIP P. CHASE, DR. HARRIS KENNEDY,
MRS. W. RODMAN PEABODY, MISS MARGARET A. RAND,
HARRY S. RAND, WM. P. RICH, JAMES WHEELER.

MASSACHUSETTS HORTICULTURAL SOCIETY.

1915.

The Transactions of the Society are issued annually in two parts under the direction of the Committee on Lectures and Publications.

Communications relating to the objects of the Society, its publications, exhibitions, and membership, may be addressed to William P. Rich, Secretary, Horticultural Hall, No. 300 Massachusetts Avenue, Boston, Massachusetts.

WILFRID WHEELER, *Chairman*
GEORGE B. DORR
F. C. SEARS
FRED A. WILSON

Committee on Lectures and Publications.

CONTENTS.

THE INAUGURAL MEETING 7

HORTICULTURAL PAPERS AND DISCUSSIONS . . .

Selection and Care of House Plants. By *Fred E. Palmer* 13

Trees and Shrubs for Home Grounds. By *Prof. A. K. Harrison* 22

Cottage Gardens for Massachusetts. By *P. H. Ellwood, Jr.* 37

Garden Furnishings. By *Prof. Frank A. Waugh* . . 47

Practical Management of the Home Flower Garden. By *Prof. A. H. Nehrling* 55

The Home Vegetable Garden. By *H. F. Tompson* . 61

Pruning. By *Prof. F. C. Sears* 69

The Culture of Hardy Shrubs. By *Arthur E. Thatcher* . 77

The Insect Outlook for New England. By *Dr. H. T. Fernald* 87

Diseases of the Peony. By *Prof. H. H. Whetzel* . . 103

THE INAUGURAL MEETING, JANUARY 9, 1915.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

1915, PART I.

INAUGURAL MEETING.

The Inaugural Meeting of the Massachusetts Horticultural Society for the year 1915 was held at Horticultural Hall, Boston, on Saturday, January 9, at eleven o'clock, with President Farquhar in the Chair.

The call for the meeting was read by the Secretary and the record of the preceding meeting, that of November 14, 1914, was read and approved.

The President then delivered the following inaugural address:

Inaugural Address of President Farquhar.

Members of the Massachusetts Horticultural Society;

Ladies and Gentlemen: —

During the year 1914 our Society has gained 130 new members and has lost by death and other causes 32, making a gain of 98 members for the year and a total membership of 937.

The income from membership for the past year has been $3582.00, about $3000.00 of this total coming from new life-memberships. This is the largest amount received from this source in any year, with one exception, in the history of the Society.

We have distributed in Cash Prizes, Medals and Gratuities $7035.00. This includes 53 Medals, of which 4 were Gold Medals given for objects of more than usual merit.

The report of the Treasurer will show that the financial condition of the Society is much the same as last year. Were it not for the large amount received from new membership fees, however, we should have had a deficit. I contend that receipts from life-membership fees should not be used to meet current expenses, but should be added to our permanent fund and the income only to be expended.

Both the financial and horticultural conditions of the Society are far from being satisfactory, when compared with the progress being made by similar organizations elsewhere.

At your last meeting you instructed your trustees to inquire into and to report to you upon the practicability of changing the interior of this building. Over five years ago, as you may recall, I urged that this should be done and now, as nearly all our members see the necessity of it, I feel that a more thorough rearrangement even than was then contemplated will soon be made.

From plans and information which have been already obtained, without expense to the Society, I am pleased to inform you that the practicability of a rearrangement has been demonstrated and without change of the beautiful exterior walls, except to strengthen the brick wall on the alley-way side.

Experts have stated that with such changes as may readily be made, our building, situated on one of the most rapidly advancing sites in the city, would unquestionably yield a substantial revenue over and above the requirements of a sinking fund to provide for its reconstruction.

While our Society is not organized for money making, it needs money to carry on its work and at present it is sadly handicapped by the lack of it.

I have long felt that our work is not as progressive as the times demand that it should be, and I hope that our Trustees will, in the near future, deem it advisable to constitute a committee on Horticultural Progress, to study closely the activities of the various committees of the Society and to advise as to future policy.

The important horticultural event of the past year was the achievement of the Convention Garden in the Fenway, in connection with the Convention of the Society of American Florists and Ornamental Horticulturists. The success of this undertaking was

due largely to the support of this Society and its members. The garden will be further developed and permanently maintained by the city.

In order that the Society may continue to exercise a strong influence in promoting advancement in Horticulture, it must extend that influence beyond eastern Massachusetts.

The visit of the Garden Committee last Summer to Lenox has already developed far-reaching benefits. Our exhibitions should exert a wider influence and to accomplish this they should be reduced in number and made more extensive.

Our Society has the opportunity to become a much more potent agency in developing interest in and promoting knowledge of Horticulture than it is at present. Let us work for the accomplishment of this purpose.

At the conclusion of his address the President called for the usual annual reports of the officers and chairmen of the various committees which were presented in the following order:

Report of the Board of Trustees, by the Secretary.

Report of the Treasurer, Walter Hunnewell.

Report of the Secretary and Librarian.

Report of the Delegate to the State Board of Agriculture, Wilfrid Wheeler.

Report of the Committee on Prizes and Exhibitions, James Wheeler, Chairman.

Report of the Committee on Plants and Flowers, T. D. Hatfield, Chairman.

Report of the Committee on Fruits, Edward B. Wilder, Chairman.

Report of the Committee on Vegetables, Duncan Finlayson, Chairman.

Report of the Committee on Gardens, John K. M. L. Farquhar, Chairman.

Report of the Committee on Children's Gardens, H. S. Adams, Chairman.

Report of the Committee on Lectures, Wilfrid Wheeler, Chairman.

The reports were separately accepted and referred to the Committee on Lectures and Publications for printing in the Transactions of the Society.

The meeting was then dissolved.

WILLIAM P. RICH,
Secretary.

HORTICULTURAL PAPERS AND DISCUSSIONS.

SELECTION AND CARE OF HOUSE PLANTS.

By Fred E. Palmer, Brookline, Mass.

Delivered before the Society, January 16, 1915.

It is customary and often edifying in presenting a subject to an audience to trace its early history and find out as far as possible what bearing the past has on the present, thereby pointing a moral and adorning a tale that might otherwise be tame and uninteresting.

The task of discovering a time or place when men first began to take pleasure in the companionship of flowers appealed to the writer as too large an undertaking to attempt in connection with this simple paper. It does seem true that the flowers of early literature took on almost entirely symbolic or art phases and never were portrayed as intimate companions and household pets in the sense that we are discussing them today. People who naturally love flowers attempt to associate their increasing use and enjoyment with the upward growth of civilization. This would be a very difficult case to prove because of the difference of opinion as to what constitutes civilization. Certain climatic causes seem to foster the love for flowers as well as social and economic conditions that insure permanent homes and some leisure time. The beautiful gardens of Great Britain and some countries of Continental Europe bear witness to this. There, the climate is just rigorous enough to give a zest to flower cultivation but not severe enough to cause discouragement. People occupy the same houses for many years, as a rule, and the long days give leisure even to the hardest workers to enjoy the rural pleasures that have become a large part of their natures.

Coming down to the individual, any attempt to assess virtue or character on the basis of an appreciation or love of flowers would be as unjust as it would be to endorse Shakespeare's denunciation of "the man who hath no music in his soul." As a matter of fact, no law can be formulated bearing on the case; temperament and environment being probably the principal factors in this as in many

other phases of our life. The superstition that a man's character must necessarily be influenced for good by an enforced association with flowers, as for instance, one who gains his living by their cultivation, is equally erroneous as is also that other common fallacy that certain personalities have such a baneful effect on plants and flowers that the latter would rather die than endure their attentions. If any in this audience are suffering under this last depressing thought, let them cheer up at once for there is certainly nothing whatever in it.

A desire that is sufficiently strong to compel a study of the needs and requirements of the object of its devotion will certainly result in success. Indeed, the essential causes of success or of failure are generally so simple and easily explained that no one need waste time searching for them in deep and mysterious places. When we consider how much pleasure may be gathered from the cultivation of flowers and with what tender and affectionate regard they are held by almost everyone who has once become acquainted with them, it is surprising that the study of their habits and needs is not more thorough and general.

In pursuing this study, we will consider first the fundamental requirements of all plants and how nearly we may reach ideal conditions in the average home. The most essential need is light, direct sunlight if possible, at any rate, daylight and plenty of it. This fact is so important that it cannot be overestimated. Indeed, it is safe to say that if this one condition is granted, all others can be so easily provided as to make success assured with very little effort. It is only in recent years that the value of unobstructed daylight in greenhouses has been understood and appreciated by professional gardeners. When the old-fashioned, heavy framed, small glass structures gave place to the modern greenhouses and the wonderful results became apparent, horticulturists were amazed to realize how such a simple thing should have remained so long undiscovered. Today, the new greenhouses are "a little lighter than outdoors"; every unnecessary post and bar is zealously eliminated, any defective pane of glass is discarded until our old friend "Sol" is made to give up to the utmost every little flower producing unit that he contains. This one discovery has enabled growers to produce the wonderful roses and carnations that we see

today and to sell them at half the price that the few of similar quality brought twenty-five years ago. Nothing else has changed; watering, heating, feeding, and ventilating have continued just the same, but this great life giving force of sunlight has been gathered in and used to the full. This will be worth remembering in every phase of gardening experience. It will cause you to pull aside curtains and roll up shades in the early morning so that the plants in the window may get the first bit of daylight. It will warn you against placing window boxes under awnings, or flower beds in the dense shade of trees, and even the hardy shrubs will be give their full share of the blue sky overhead.

Apropos to this particular phase of the subject is the fact that many householders, having become disappointed at their inability to really grow plants and flowers in their living rooms, have improvised plant rooms out of existing sun parlors or enclosed piazzas, or have built a small addition to the house for this particular purpose. These, if properly designed, are proving most successful, not only as conservatories where plants will really thrive, but as most delightful sitting rooms. Indeed, the combination of sitting-room and conservatory is the principal charm of this arrangement, differing entirely from the old-fashioned elaborate and expensive conservatory which at best was a thing apart from the home. It is safe to predict that in the near future very few houses of any pretention will be designed without this charming feature being considered an essential part of it.

Coming back to the regular living rooms, which is where our immediate interest lies, and still having in mind the question of light, it is quite possible to keep a variety of plants in comparatively healthy condition in rooms on southeast or southwest corners with good sized windows on both sides, provided one is prepared to consider the needs of the plants as of first importance and is willing to give them the constant attention that every living thing requires. This attention should begin by removing every bit of shade such as roller curtains and draperies as soon as the first daylight appears and allowing the window throughout the day to fulfil its one essential function which is to admit daylight to the room. With a room thus flooded with light, many foliage plants will thrive even at a considerable distance from the windows, in fact some plants

have a marvelous capacity for adapting themselves to conditions that are far from ideal. Some instances of this adaptation, which refers more particularly to foliage plants, will be given later when discussing individual species and varieties.

Flowering plants, on the other hand, are most exacting and will tolerate no position short of the immediate window-sill. Take for example the common geranium. Every year, just as soon as the days begin to shorten and the light is reduced to its minimum, the cry goes up, "Why do my geraniums stop flowering, my neighbor has a window full of beautiful flowers? Is n't there some kind of fertilizer that I can give them?" The plant doctor makes his visit and like the modern physician, he goes without bottle or pill. He finds the little patients standing on a table a foot or two away from the window with heavy draperies partly drawn and roller shades half down, obscuring a greater part of the available daylight. Moreover, the plants are in pots very much too large for them and are generally standing in saucers full of water, which aggravates the case. If he knows his business, he will recommend that the plants be pushed forward to the window-sill until the leaves touch the glass, possibly that they be repotted into comparatively small pots, cutting down their meat diet as it were, or at any rate, withholding the excess of water. On his way home the plant doctor takes a look at the successful neighbor's window, which by the way, is the same quoted by many other clients, and finds it a bay window facing south, west, and east, catching every bit of sunlight that comes that way. The narrow sill is packed with small geraniums in four-inch pots, their leaves are almost pasted to the glass and they are in full bloom. He realizes with pleasure that some one is having a good time in that particular house, having discovered the secret of success. In this somewhat insistent plea for daylight, the geranium has been used as an example because it is the most common member of a class that needs a more abundant supply of direct sunlight than any other. In warmer climes, plants of this class are evergreen and everblooming, as in southern California for instance, where they blossom literally every day in the year. Having no storehouse for their pigments, such as bulbous plants have, they mix them from day to day, each according to its needs, selecting from the solar spectrum some red, some blue, some yellow, and

make them over in their wonderful laboratories into the beautiful flowers that we admire. Take away this source of supply and they find themselves in the predicament that many of our textile manufacturers are in, now that the supply of dyes from Germany has been reduced by the war, for they have to be content with simple green dresses and wait until "sunnier" times arrive.

The need of proper watering may be mentioned next. How much water and how often to be given seems to be a process in plant culture more difficult than any other for the average amateur grower to understand. The trouble seems to be that plants have been classified by species rather than by individuals in regard to their need of water. Does a begonia need more water than a primrose? or a cyclamen more than a geranium? is invariably the form of the question. As a matter of fact, with the following three conditions existing, it is almost impossible to overwater:

1. A plant with a relatively large amount of foliage and blossom in a small pot.
2. A warm room with very dry atmosphere.
3. Effective drainage in a pot which allows all superfluous water to drain away quickly.

On the other hand, if a plant is in an oversized pot, especially when the earth has been insufficiently "firmed" down, it is very slow to dry out and will quickly suffer from too much water. The soil in this case is like a loose sponge and remains saturated for a long time. It is worth remarking that all inexperienced amateurs use pots much too large for the needs of the plant and always leave the soil in a loose, spongy condition, both of which are conducive to ill health in the plant. No amount of drainage will help much under these conditions and if, as is often necessary, the plants are all kept in saucers, it will be almost impossible to keep these overpotted ones in good health. Even with all conditions ideal, it is impossible to lay down a rule as to frequency of watering. The successful professional grower relies entirely on his daily observation as to when a plant needs water, the dry aspect and light color of pot and soil being his principal guides. Stern necessity has trained his eye to be very keen in this respect; with the amateur, an equally strong desire to succeed would quickly have the same result. Perhaps the best general rule for the amateur would be

that when the soil in any pot or box has dried out so that it is friable or crumbly to the touch, as distinguished from a pasty condition, it is time to water it. In every case, enough water should be given to saturate the entire bole of earth at the time. Continual watering or spraying the foliage of plants is injurious. An occasional washing or spraying for cleansing purposes only is permissible however, the leaves not being able to perform their function if covered by dust or the exudations from insects or even the oil with which some people are wont to anoint them.

The use of saucers in which to stand potted plants may be a benefit or an evil according to the degree of intelligence exercised. Some provision, of course, is necessary to prevent water which runs through the pot from injuring the floor or furniture. On the other hand, many plants suffer from standing saturated all the time in a saucer full of water. This evil can easily be obviated by filling a saucer half-full of small pebbles, in fact, the very best arrangement for a group of window plants is to provide a shelf the full length of the window and about twelve inches wide. Cover this entirely with a flat tray of galvanized iron two inches deep, filling it one and one-half inches deep with a layer of white pebbles. Plants standing on this may be watered without any fear of overdoing it. The superfluous water runs in among the pebbles and quickly evaporates so that there is no need of providing any special means of drawing it off. This constant evaporation is of great benefit to the plants and the whole affair is neat and practical.

There is no royal road to the successful cultivation of flowers, even under favorable conditions, much less so with the serious handicaps which have been indicated. It is not a question of formulas or of higher education, or deep studies in botany or of soils or fertilizers, nor does it involve the abstruse questions lately set forth by some impressionist biologist as to whether plants shudder or weep or laugh and clap their hands when you come into their presence; it is simply whether you care enough for them to give some time to their study and to supply their needs just as one would to a child or a highly prized dog.

In the matter of heating and ventilating the room, plants have to put up with what they can get. Excessive heat is perhaps second in the list of unfavorable conditions to which house plants are

subjected. This is aggravated by violent extremes caused by throwing open windows when airing the room and by a draft blowing in around a poorly fitting sash. This latter continuing through every cold night is sufficient to destroy a whole window full of plants during the winter. Every window devoted to plants should be double glazed and great care used in airing the room on very cold days. Valuable palms are often destroyed by allowing an icy draft from an open window to strike them. Only a few minutes are necessary to accomplish this destruction, when the temperature outside is much below freezing. It is well to remember that all plants are benefited by comparatively low temperature at night, so that if circumstances compel them to be subjected to a temperature of 80° in the day, they should be given a rest at night by lowering the room to 60°.

The following list of plants has been grouped according to positions which they are usually called upon to fill and their names are placed in the order of their value in the group.

Group 1. Flowering plants that under good conditions should be in flower from October to May. To get results, these require the best care and environment possible and practically the same treatment applies to all in the group.

a Cyclamen, certainly the best flowering plant.
b Begonias, everblooming varieties and Begonia Gloire de Lorraine hybrids.
c Primulas, Sinensis (Chinese primrose), Obconica (poisonous variety).
d Geraniums.
e Heliotropes.
f Linums (yellow flax, like California poppy).
g Impatiens Sultana.
h Tea Roses, March, April, and May only.

Group 2. Plants that flower for a limited season and are not as particular as to sunlight as Group 1.

a Azaleas, in season from November to May.
b Chrysanthemums, October and November.
c Celosias, Princess Feather, October, November, December.
d Canterbury Bells, March, April, and May.
e Fuchsias, September, October, and November.

f Gloxinias, March, April, and May.
g Genistas, March, April, and May.
h Hydrangeas and all the spring-flowering shrubs, such as lilacs, *Azalea mollis*, Rambler roses, also all French and Dutch bulbs.

The Dutch bulbs may be grown from the beginning by any one having a back-yard or shed in which to carry them through the fall months. When the severe frost sets in, they can be transferred to the coolest part of the cellar and afterwards be brought to the window from time to time as desired. The French Paper White Narcissus, which has been a despised member of the family for so many years, has recently sprung into immense popularity and is much easier to cultivate. A few bulbs in a dish half-filled with pebbles and water, placed in the window or on the table, will grow and flower without the least care; and successive plantings every two weeks will yield a continuous supply of flowers all winter. It is safe to predict that next winter will see these simple bulbs planted by the million.

Group 3. Foliage plants used to stand about the house for decorative purposes:

a Palms: *Kentia Belmoreana, Kentia Forsteriana, Areca lutescens, Phoenix Roebelenii.*
b Ficus, rubber plant.
c *Dracaena Lindenii.*
d *Pandanus Veitchii.*
e Araucaria, monkey tree.
f Aspidistra.
g Ferns of different kinds.

The above list comprises the kind of plants that will endure the uncongenial environment of the average house plant as bravely as any. Many of them are very tenacious of life indeed and adapt themselves to adverse conditions in a marvelous way. This is such an interesting study that a few remarkable instances which have come under our personal observation are worth reciting. The first is a plant, a *Dracaena Lindenii*, which has been standing on an upper landing for more than fifteen years. Scarcely a ray of sunlight reaches it, it has never been repotted, and it has never been out of the house. It stands about seven feet tall, has lost very few

leaves, and is in pretty good health. Two other cases were *Pandanus Veitchii*. Both of these remained in six-inch pots for a matter of ten years, stood in a very unfavorable position, and yet had grown into fine, handsome plants. Both died promptly when put into larger pots. There is in our store in Brookline a very handsome specimen of Kentia palm. It came to us a year ago, having been for many years in a large private dining room. The new environment seems to suit it, being very similar to the old, although both, according to the code, are entirely unsuited to any healthy plant life.

These apparent vagaries and contradictions of nature in the plant world should furnish food for encouragement and hope in the more serious affairs of human life. They might easily teach that by perseverance and adaptation to the inevitable a great deal of happiness may be gotten out of conditions that some would consider intolerable.

TREES AND SHRUBS FOR HOME GROUNDS.

By Prof. Arthur K. Harrison, Amherst, Mass.

Delivered before the Society, January 30, 1915.

There has been a great development in the appearance and care of home grounds in the last few decades, which has been brought about largely by a better knowledge and use of hardy plants. This wider appreciation of hardy and especially of native plants is a result of the teaching and practice of Mr. Frederick Law Olmsted and his disciples.

Mr. Olmsted's extensive use of our native flora, which before his time had been very little used and that use more abroad than in our own country, was really an epoch-making departure in American horticulture. It was however a perfectly natural and logical thing both from the standpoint of business economy and of artistic effect and, the value of the new idea being apparent, it met with general approval and popularity.

There have been great changes in our modes and conditions of life in recent years which have had wide influence on homes and surroundings. The peace and prosperity of these years have produced an increasing number of well-to-do families who have more or less time and means at their disposal for attention to artistic surroundings and the enjoyment of outdoor life.

A great advance in all lines of artistic and allied endeavor has resulted, architecture has taken on new life, transportation has been revolutionized, dress has changed, agriculture has become a new thing, horticulture has wonderfully advanced, printing and illustrating have been vastly improved. The electric car has made it possible for city dwellers to go to the suburbs where lawns and gardens can be made, the automobile has taken the suburbanite and the wealthy business man still farther into the country and developed the country home and country road improvement.

A far-reaching body of horticultural, architectural, and agricultural periodicals has developed which has widened the desire for

better home surroundings. Opportunities for the exchange of ideas regarding improved home conditions, or for the employment of persons devoting their endeavors to the artistic and economical planning of homes and home surroundings have vastly increased; and the trade in horticultural materials has correspondingly developed.

In spite of all this, however, in spite of all that has been said and written and done, there remains yet much room for improvement. The extension and development of suburban regions have brought problems, some of which are not yet satisfactorily solved. These problems are mostly of the larger kind involving the community life and welfare; smaller problems affecting the individual homes are, however, constantly recurring.

The development of real estate subdivisions has made it necessary often to locate dwellings on lands heretofore thought too steep, too rugged, or too low for such uses, and it has been necessary to plan for such development not only in grading, drainage, and road construction, but also for successful planting in varying soils and exposures.

So much has been said and written on these subjects that the field has been well gone over and perhaps I shall have nothing new to bring to you. If such is the case it really need not disappoint or discourage anyone, for the most familiar subjects need constant repetition.

In agricultural and horticultural work we are finding that a thorough physical preparation of the soil is of the greatest importance, that for the best results it is necessary to go over the same ground repeatedly. This is quite as true in teaching where drill or repetition is imperative. Moreover, a new generation of home builders is constantly coming on and to them some of the problems are new.

Taken as a whole there is a marked difference between the present home surroundings in country or country village and in residential suburbs. Many of the country homes have been long established and their character and surroundings largely fixed before the recent advances of which I have spoken. Many of the suburban homes are of recent construction and have profited by present day architecture and planting. Moreover, there are a

greater number of persons of leisure in suburban regions and the areas are limited so that more can be done in planning and maintenance.

There is also a considerable difference in the mental attitude of the country and the suburban dweller, particularly of the masculine gender, toward ornamental gardening and garden materials.

The country man appreciates the large and sturdy things, he loves a tree, he tolerates the flowers in the front yard, but he has very little use for shrubs and then only for a few specimen plants; masses or borders of shrubs he despises. He has too many on the farm lots to contend with; they cumber the ground and harbor undesirable animals; their wood is of no value and their use or desirability about the house he questions.

The tree however is different, it takes up little ground space, it furnishes grateful shade or protection from winds, its beauty is apparent and its wood is valuable, so that the country man believes in trees, he appreciates their artistic value and desirability about the home, and even when they interfere with his work and must be removed he does not curse them as he does the hedgerow, but goes to the attack with "the stern joy which warriors feel in foemen worthy of their steel."

The man of the suburbs has less of this ingrained love of trees because he has not lived with them so intimately; he does have a greater appreciation of flowers and flowering shrubs, for his experiences do not include so many years of uprooting and clearing hedgerows and his opportunities of seeing and enjoying lawns and planted spaces have been greater. The feelings of the women of country and suburbs do not, perhaps, vary so much, for their experiences with the different plant forms have not usually been so intimate and their appreciation of artistic and decorative values if not keener are at least more responsive and unbiased.

Partly as a result of these divergent views and partly because there is a greater opportunity for choice of house location on the farm than on the suburban lot, the usual condition is that the country or village home has plenty of trees but few shrubs, while the suburban home has few trees and an abundance of shrub growth. The country home has been placed near existing trees or it has been long established and its trees have reached good size,

while no trees have existed on the suburban lot and its recent planting has but little development. The lack of the suburban home is perhaps not so great because there are often trees along the street or streets bordering the lot, but it is a lack nevertheless.

While it is true that shrub growth is an especially useful plant form for suburban lots, because of its permanence, its convenient size, its quick growth, infinite variety and especial fitness for screens, slopes and borders, yet it cannot take the place of the larger tree forms and a more careful study and wider appreciation of trees is desirable.

In places where wooded areas are developed into building lots this is not the case but usually so much of the area is taken up with roads, walks, walls, buildings, and other structures that much of the existing growth is sacrificed. Such a sacrifice of shrub growth is, perhaps, not so serious, for shrubs can often be moved or at the worst can be replaced without great outlay of money or time, but with tree growth the case is very different, for young specimens take years for development and even at great expense mature effects are impossible. The logical deduction is that the first duty should be to save all the existing tree growth possible, no matter what its kind or condition. Streets and lot lines should be planned with this end in view and the purchaser should plan his house and lot accordingly. Of course hopelessly diseased and misshapen trees should not be allowed to distort the general design but much may be made of ordinary materials.

One occasionally sees good examples of this on suburban house lots where the natural hedgerows have been retained as screens or border plantings. The hedgerows are made up of a considerable variety of native trees and shrubs, none of which are well developed single specimens, but their combined effect is decidedly good and it would require some years and quite an expenditure of money in order to produce a similar effect with planted materials. Many homes in our state show such an appreciation of native growth. I was especially interested, during a trip to the Maritime Provinces, to see how the native growth had been retained about a summer home just outside of the village of Baddeck in Cape Breton where the various outbuildings had been carefully placed among the spruces and firs in such a way as to make a pleasing and convenient grouping of necessary but usually unattractive structures.

The same thing was done in a somewhat larger way in the mining town of Gwinn in the upper peninsula of Michigan, where in clearing the town site and in constructing roads and buildings a few years ago, we carefully saved all the native growth possible. The growth was largely poplar, birch, and the short-leaved jack pine. Few of the trees were well-developed individuals but the general effect was decidedly good.

In the town of Winchester, eight miles north of Boston, are two elm trees which are of especial interest because they have been retained under conditions where ordinarily they would have been cut. Church street is one of the important streets of the town and when the street was widened some years ago it was proposed to cut a beautiful elm standing at the curb line near the center of the town, but public spirited citizens rose to the occasion and at a cost of something over one thousand dollars purchased sufficient land to provide a roadway at each side and retain the tree which now stands practically in the center of the street close to the car track. There is, however, plenty of room for passing, and a careful arrangement of street lights prevents accidents at night. Another elm on the town hall grounds stands barely two feet from the wall of the building to which it adds a decided touch of interest. These two examples suggest the value of a single tree which in some positions is almost beyond estimate.

At Mr. W. D. Sloan's place in Lenox the great house was located with particular reference to a splendid elm from which the place is known as "Elm Court." At Mr. William H. Moore's place in Pride's Crossing there is a double white oak between the house and the tennis court which though not especially large is graceful and very fitting in its location, casting interesting shadows on the lawn and sheltering a beautifully carved marble seat at its base. These two gentlemen value their trees at the good round sum of one million dollars each.

In my own home village of Lebanon Springs, New York, there stands in one of the yards a great tall broad spreading elm which reaches out over the house and its surroundings with protecting arms and gives to the place a definite character and distinction. A prominent Brooklyn divine, a native of our town, always raises his hat to this tree when he passes. The Winchester town hall is

not altogether uninteresting architecturally, but its beauty is much improved by the foliage effects or tracery of branches of the elm at its side.

It is one of the best known facts of landscape design that foliage enhances the charm of architecture, no matter how primitive or how refined the architecture may be. The artist passes by the larger and pretentious home but spreads his canvas for the vine-draped cottage though without its wealth of foliage it would be a hovel.

Those who are familiar with Grace Hall, the new auditorium at Williams' College, will remember that seen from the front approach where the whole of the structure appears unrelieved by foliage, it is but a building, though a well-designed and finely executed one. From the lawn of the old Van Rensselaer place, next door, one gets a glimpse of the beautifully proportioned columns with their fine Corinthian capitals and the broad low classic pediment, the whole framed in at the sides by dark evergreen foliage of arbor-vitae; not simply a building, but a picture suggesting at once "The glory that was Greece and the grandeur that was Rome."

When we come to a choice of trees for planting on our home grounds we can then consider kinds and forms, and it is at once apparent that there are at least three great groups from which we may select, and our choice of the group from which to select will be governed by the use or end for which we are planting.

These groups run into each other somewhat, but still it is quite possible to recognize a group especially useful for shade, another having particular beauty of form or outline but of less value for shade, and a third bearing showy flowers. Certain trees are desirable for shade, they have good-sized leaves in rather thick heads on trunks of moderate height, and are mostly broad spreading in form. Some are more desirable than others on account of density of shade, sturdiness of character, tolerance of abuse, or cleanness of growth. The maples have been perhaps the most generally planted of shade trees and deservedly so, as they have many points of excellence; comparatively rapid growth, clean and free from litter, few enemies, easily moved, considerable variations in leaf character and density of shade, wide adaptability to soil conditions, and particularly good fall coloring; they have long been popularly considered the most useful street and lawn tree.

In early days the maple was much planted because it was easily obtained from the woods or fields and was not at all difficult to move even in good size; but it was planted for a double purpose; not only was it attractive and useful as a shade tree in home grounds, but it also gave an annual revenue of sugar so that the early settler was independent of the market source of supply and frequent long lines of roadside trees in many parts of New England give ample proof of the enterprise of our forefathers who set them not alone for roadside adornment but also from love of sweet or greed of gain; this however was in the good old days before ever we had Cuba, the Philippines, or the sugar trust on our hands. *Acer saccharum*, *A. saccharinum*, and *A. rubrum* are our native species, the two latter especially useful in moist soils, while *A. platanoides* is the most useful European species.

Next to the maples in popular approval, and probably even more valuable, are the different species of oaks; trees which are characterized by a thrifty if not rapid growth, broad spreading habit, good shade without being so dense as to prevent air circulation, and especially long-lived sturdy character. They have not been so much planted as the maples because they lack the sugar making qualities and because they are not so easily transplanted in good size from the wild, though nursery stock is readily handled. The best species for ordinary soils are *Quercus palustris*, *Q. alba*, and *Q. rubra*, while *Q. bicolor* and the first-named, *Q. palustris*, are good for moist soils.

Some of the poplars and willows which are much planted where quick effects are needed are decidedly good; the poplars of large leaf and rapid growth serve very well for shade, while other kinds are coming to effective size, but for the most part they are not as good for permanent trees and should be replaced by other species. The Lombardy poplar certainly has a place in suburban planting where narrow high screens are necessary and when dilapidated or injured by age is easily replaced.

The ordinary white willow, which however is not a native, is a decidedly useful and beautiful tree. It will succeed almost anywhere and it has altogether different foliage character from any other of our large tree forms. The graceful form of branching and the play of light and shade as the wind passes over it are especially

pleasing. It will fit in almost anywhere as it embraces rock or wall or building with protecting arms and whatever form it assumes has a grace and beauty of its own.

The buttonwood is hardly useful for a lawn shade tree, its size is large and crown too open, at least this is the case with out native species; the Oriental plane is more fitted for home grounds where it is considerably used.

The different species of ash and beech give good shade, but the ash is not as graceful in twig growth and its leaves fall quite early, while the beech is slow in growth and impatient of injury to its roots. If purple-leaved trees must be planted, the beech is the best of them, but judging from the kinds used on the hills and in the valleys all over this world of ours, the Lord likes green foliage better.

Of the kinds remarkable for their beauty but less useful for shade, the elm easily stands first; its usual form of open top on a tall trunk makes it unsatisfactory where a dense shade is desired at a given point, for its shadow is relatively light and, because of the tall trunk, the shadow moves about much during the day. The elm however should always be planted, especially where it has room to develop and where it can be seen from a little distance so that its graceful form may be appreciated. I know that it takes some fortitude to recommend the planting of elms to a Boston audience, but no one who has ever enjoyed the picture of the graceful pendent branches and feathered trunks of the elms as they frame in the beautiful church door at the head of that historic first street in America at Plymouth, or who has ever read Henry Ward Beecher's remark on the elms of New England and especially of the village of "Norwood," which by the way was our own college town of Amherst, can ever quite neglect the elm or find any reason to doubt the statement of Michaux that it is the most magnificent plant of the temperate zone.

Chestnuts and hickories are well worth preserving when already established, but they litter the lawn with burs or shucks; while the slow growth of the hickory and the liability of the chestnut to the rapidly spreading bark disease, together with its unpleasant odor at flowering time, make them unsatisfactory for lawn planting when a choice of kinds is possible.

Among the showy flowering trees the most commonly planted is the horse chestnut which, coming to us from Asia, has proven entirely hardy, though rarely reproducing itself. It is the most successful or at least the most widely planted of any flowering tree. It gives good shade, but is not so broad spreading as the oak or so long lived.

Somewhat less common, because less hardy, especially when young, is the catalpa, whose broad leaves and large flowers are especially attractive in early summer. This tree deserves to be more widely planted, as it combines an attractive luxuriant foliage with a beautiful display of flowers. The southern species, *C. bignonioides*, is the best, but the western *C. speciosa* is usually more hardy. The foreign kinds are smaller and well suited to limited areas.

The most showy flowered of our northern trees of large size is the tulip or white wood. Related to the magnolias, though not especially resembling them, it is fine, clean, and thrifty, and well deserves planting, not so much for its large cup-shaped flowers of orange and pale yellowish green as for the clean healthy foliage and general shade value.

Another native tree of value for shade and flowers is the basswood or linden of rather rapid growth. It is larger and more ovate in form than its European relatives which are useful in positions too small for the larger sorts.

The locust which was frequently planted about old country homes has an abundance of very sweet flowers but it is of little value for shade on account of the small size of its foliage and the extreme lateness of leafing as well as early loss of foliage by frosts. It is not therefore to be recommended.

Of our small-sized flowering trees none is more showy than the flowering dogwood, a native as far north as central New England; here of small size but from New York southward often attaining a trunk diameter of a foot or more. From its size, flowering date, and general character and uses it is rather to be classed with the magnolias though in no way related to them.

I believe that the flowering trees which we most neglect in lawn planting are the useful fruits. It was one of the marked characteristics of Andrew J. Downing's work that he constantly made use of fruit trees in his home ground plans, not so much for their

economic as for their ornamental value. I believe that we are seriously at fault in not using them more often in lawns. The whole growth and character of the apple fits it admirably for such use and it is hard to imagine a more interesting detail than a well-formed, low-branched apple tree flowing into the easy curves of a nicely graded lawn. It is ornamental in flower and scarcely less so in fruit, and its economic value is no small item to the lot owner. Other kinds of fruit trees are almost as ornamental and are well worth planting, the quince, especially, would lend a decided attraction to our larger shrub borders.

Trees planted for particular beauty in color, form, or gracefulness of branching require careful study. Their special merits or individual characteristics should be well brought out either by harmonious placing or by occasional sharp contrasts. The graceful branching of the birch is best shown by well-developed individual specimens so placed that they may often be seen from a distance sufficient for the eye to take in the whole form or where the light-barked kinds will show against a contrasting background of darker, especially of evergreen, foliage. The same may be said of that really novel tree, the larch, whose chief beauty appears with the tender green of early spring. The coarser, rigid branching forms like the sassafras, coffee tree, and pepperidge show their characteristics better when seen against the sky.

Two trees much planted in recent years and well worth a place in lawns of considerable size are the maidenhair with its strong, pointed, divergent branches, clothed with peculiar straight-veined fan-shaped leaves; and the sweet gum, artistic in all its parts, the star-shaped leaves turning to beautiful shade of crimson, the fruiting head a perfection of design; it is a southern tree native as far north as southern New England and well deserves planting wherever it will prove hardy.

The contrasting forms should be used with greatest care and only in small amounts. We like to have some sharp accents to give life and spirit to our musical compositions. So too the artist likes to see some accent in his landscape pictures, but a little is enough. The upright forms furnish this accentuation. The narrow evergreen forms and, especially, the Lombardy poplar serve such purposes and may occasionally be used to break an even sky line to good effect.

Another form of contrast is the dark color of the evergreen, and evergreens should be used either as single well-developed specimens in remote parts of the lawn or in groups for mass effects or as dark backgrounds for other shrubs and trees. They may well serve as screens or windbreaks or to give snow effects, but from their conical form they are not to be selected when shade is the main consideration. In spite of all the kinds which have been brought to us from near and far, the white pine and the hemlock are unsurpassed and no mistake can be made in their selection.

Next to the establishment of a good lawn surface, the greatest improvement in home ground planting results from the use of shrubs. Suburban regions simply show this improvement more often than do country homes.

Natural shrubbery is characteristically informal; and home ground planting should be the same. Formality in shrub planting may be had by careful selection of special kinds supplemented by repeated use of the shears in a misdirected effort to improve on nature. Any man who devotes his efforts to clipping otherwise graceful and artistic shrubbery down to severe straight lines or rounded forms should the next day get out his paint pot and go at the lily — nature is constantly making blunders which we can rectify.

The one most excusable form of shrub pruning is the close-clipped hedge and there are places where such a treatment is well enough or even desirable, but in many places the clipped hedge might better be replaced by the irregular lines of an informal shrub border or by a vine covered fence.

In border plantations we have a much greater degree of variety and beauty; variety in position, form, flowers, shades of foliage, height, etc. The two chief lines or parts of beauty in the irregular border are the sinuous line where the foliage meets the lawn and casts interesting shadows and the varying height and form of sky line. Such irregular lines are not only beautiful, but they are elastic, changes may come, shrubs may die and be removed, or additional ones may be planted without destroying any of the beauty or effectiveness — which does not depend on any one thing but on the whole appearance.

In close-clipped hedges, however, beauty depends entirely on

one thing, perfection. The shade of green must be the same throughout, all plants must be equally tall and sturdy, all well branched at the base and in every other way, each must be a repetition of the next and, just because the beauty of the whole depends on this one thing, perfection, the eye, no doubt unintentionally, seeks out the blemishes and any departure from perfection, any missing plant or lack of best development shows up at once a fault as glaringly as do princely or even imperial transgressions "in that fierce light which beats upon a throne."

Irregular shrub borders give fine opportunity for the use of kinds of varying size so that in the broader parts of the border tall sorts may be used in the rear or on prominent points along the front and, by the use of such points and bays and occasional islands of shrubbery in front of bays, hidden effects may be provided which, come upon unawares, add new interest to the plantations.

A shrub border always looks better with a foreground of turf and for this reason shrubbery should, whenever possible, be kept back some four or five feet from roads and paths. In broader areas, where shrub grouping is possible in other places than along borders, we should be careful to have them so arranged as to bring out the beauty of surroundings as well as to show themselves off to best advantage.

Lawn vistas should be kept open and planted naturally along the sides especially where the ground slopes up at either side as in that charming bit of tree and shrub bordered lawn just across the entrance drive from Professor Sargent's house at Holm Lea or as might be the case in that other view across Leverett Pond where the rhododendrons and azaleas though beautiful in themselves, might better have been kept back from the center of the picture.

This brings up the fact that too many flowers may be a disadvantage. Most flowers, when growing, as well as when cut and arranged, are much more attractive when accompanied with considerable green foliage, and great masses of flowers with little foliage lose much of their charm, especially when the colors are particularly striking or brilliant.

Flower colors are contrasts, foliage shades are analogies. We do not care for too much contrast in life. Contrast is always active, stimulating, exciting; analogous colors and tones are tonic, re-

freshing, and restful; bread is really better for us than spice, and we need more of it.

For the same reason the showy flowered things should be used in moderation and with plenty of white, which is always harmonious and restful.

Most shrubs flower in early summer, and in order to prolong the period when flowers are to be had and enjoyed it is always well to supplement shrub growth with some sturdy perennials planted along the front of the border or with taller ones in the middle and rear. These taller perennials are usually late in flowering, so that by using them a pleasing effect may be had throughout the fall.

There are, it is true, a few fall-flowering shrubs but unfortunately they are either coarse and stiff, like the althaeas and hydrangeas, which require special positions and the softening effect of distance, or they are not particularly hardy like the Caryopteris, and Lespedeza, which is really more of an herb, and is not dependable. Much may be done, however, to prolong the season of interesting color in the shrub border by selecting kinds with brightly colored bark or fruit.

In grouping shrubs we should learn from nature where we find the hedgerows and watersides planted with considerable groups of a single kind rather than a confused mass of many kinds. In nature also the shrub groups are edged down to the turf and are clustered about ledges, fences, and other objects, keeping the center of the picture open and framing in the sides.

Next to position and size perhaps the important things to consider in associating shrubs are general texture and method of branching.

I do not like to plant the coarser things like *Rubus odoratus*, Sambucus, and Hydrangea close to the house where smaller leaved kinds, with more refined flowers and textures seem more in keeping. An association of the coarse upright branching forms, like althaeas or the dwarf horse chestnut, with slender branching spiraeas or drooping forsythias is not attractive.

For kinds there is wide choice, almost any of the hardy species are useful in some position or other, some are better in moist places, others for dry exposed banks, some for direct sunlight, others for shade. The descriptions and hints given in the retail nursery catalogs are safe guides in selection.

Many of our native species are excellent and with ordinary care large plants of azaleas, laurel, dogwoods, viburnums, or thorns may be successfully moved. The native thorns are especially valuable and one or two specimens in corners or broad plantings are very effective.

The sumacs too, are decidedly fine for massing. Among the cultivated kinds the forms of spiraeas are unlimited, Van Houttei and its near relatives being the best.

The golden forsythias should always find a place because of their early flowering and fine healthy blue green foliage.

Some shrubs or small trees are especially valuable because they flower very early and produce fine effects before others begin. The introduced magnolias do this. The kinds with smaller white flowers are more attractive, stellata especially so. Another old favorite was the flowering almond, which however fades badly and the petals fall quickly.

The bush honeysuckles are especially attractive, Morrowii and the Tartarian being best. The Snowball is an old favorite, but the Japanese form is better in flower and not so liable to insect attack which alone excludes the use of the Guelder Rose. Among other old garden shrubs which can never be dispensed with are the mock orange and the lilac, so long favorites that they often mark home sites long since deserted.

The commonly grown double hybrid roses are not nearly so well suited to border effects as are our wild ones or the imported single kinds. They should be specially grown in rich garden soil for cut flower effect and their place in the border be taken by the single forms which are much more effective as growing shrubs.

A special form of shrub indispensable for home ground is the vine. And here again we may choose for dense shade, attractive foliage, fine flower effects, or showy fruits. The native bitter sweet is unsurpassed for winter color of fruit. The Dutchman's pipe and native woodbine are thick in growth or foliage, giving shade or screen. The fine-leaved forms of Cissus or Vitis have graceful foliage and tendrils.

There are frequently unsightly or incongruous things about the grounds which can be easily screened or relieved, and this is one of the great uses to which vines may be put. An unattractive out-

building may be made attractive or the severe lines of posts or poles softened by the use of vines. The native kinds collected from hedgerows are admirable. If it is possible to relieve the stiffness of telephone and light poles the effort seems worth the while.

Among the flowering vines the earliest effects may be had with the wistarias which, though slow in growth, are incomparable in flower.

The several forms of clematis are fine; the large flowered white and purple sorts for summer, and the small flowered *C. paniculata* which is especially valuable because of its late flowering period.

In June the climbing roses are at their best and here again fewer flowers with sprays of foliage give more graceful and pleasing effects than do the masses of the commonly used Crimson Rambler. The Dorothy Perkins, Lady Gay, and other similar sorts with fewer flowers and softer coloring are better.

In a talk of this kind one can do little more than draw attention to some of the general points of interest in tree and shrub planting and mention a few of the more useful kinds. Now in closing let me sum up, if it is possible to sum up such a subject, into two general rules: First, use only hardy plants and do not overlook the native species, and secondly, study nature and those who have followed nature as your guide.

COTTAGE GARDENS FOR MASSACHUSETTS.

By P. H. Elwood, Jr., Amherst, Mass.

Delivered before the Society, January 30, 1915.

If anyone should ask me what I considered the most needed landscape development in Massachusetts, the one which would count most toward a finished and beautiful country-side as well as a contented and happy people, I would say home improvement. Anyone familiar with conditions as they generally are and with conditions as they might and should be, realizes the possibilities and need in this field of development.

When I refer to home grounds or cottage gardens I mean only areas of ground intimately connected or associated with a cottage or house of our middle and working classes whether in the open country, the rural village, or the city suburb. In short, any garden whose care is directly carried on by those who live with it. It is this type or class of gardens which really gives the most enjoyment and pleasure to their guardians and to the passers-by rather than the more pretentious gardens of the country villa. These gardens contribute more than all others to human happiness, not alone because they exist in greater numbers, but because their appeal is more direct. The one who cultivates the ground, plants and cares for the flowers, lives among them, sees them and comes to know their every caprice and individuality, gets the greatest returns in mental, physical, and spiritual happiness from his garden. In this way the garden becomes a very integral part of the home.

One of the greatest of human joys is that of creation and this is just as true whether the result is a successful business enterprise or a beautiful garden. This is the fundamental reason why women are so fond of gardens. It is one of the fields involving actual creative ability that is open to them and they respond with enthusiasm. In the garden they can actually see the results of their labor. The joy and rewards of this intimate gardening are not wholly aesthetic

as no one denies that caring for a garden affords the best mental and physical tonic.

To many minds when the term cottage garden is mentioned there come pictures of England and her picturesque cottages set amid a profusion of flowers. Let us analyze these cottage pictures of England. We find by close observation that more than half the charm of these cottage pictures is due to the cottage itself. Here in America where the average house is ugly in material, outline, and color we seldom find it fitting into a picture, but the solid and graceful English cottage with its low eaves and broken roof lines seems to have grown into its environment. The substantial material and low tones of the exterior at once suggest the quiet repose and charming home life of England. Then too, the Englishman is more modest than many of us and his main object in life is not for show and display. He is happiest when with his family he can enjoy his home environment without the help of the outside world. Consequently we do not get open and comprehensive views of the English cottage but fleeting and inviting glimpses through the luxuriant foliage and bloom. One is never fully satisfied but lingers for another passing vista. The lure of this element of mystery is most engaging and we carry these little pictures with us long after and hope to see them again.

The Englishman has learned through years of inherited experience that it is absolutely essential to maintain his garden in the highest state to insure the best results and this characteristic finish is typical of the English garden in a degree almost unknown in America. But you say the English climate makes the difference; yes, it does make a difference but it is not the chief factor for with as good care we can get nearly as fine effects and with added attention we can equal if not excel. It must be said, too, that the average owner of a garden or of a few square feet of land in England takes more pride in his yard and grounds and in the general outward appearance of the community and the result is a country side dotted with pictures that are a delight to the eye and one has the impression of being in one continuous garden.

All this does not come without effort and if we are willing to pay the price in effort we can have just as charming effects at home, though in a different way. In America we are not bound by

national traditions, therefore we can go abroad for our ideals in gardens as we go for inspiration in other fields of art. With the best examples of the world's gardens before us we can select the best features from each, and with our American ingenuity and originality adapt them to our environment and needs, and produce a new type of cottage garden more beautiful here than its progenitors would be because it is American.

As surely as the English cottages fit into the landscape, as surely do our cottages fail to do so and no one thing will add more to the general attractiveness of our country and suburban districts than the creating of an artistic and appropriate type of domestic architecture.

While the scope of this paper will not permit of a lengthy and detailed discussion of this subject, yet I wish to emphasize the importance and desirability of a general awakening in this much neglected field. We have built of the cheapest and most temporary materials, constructed in the most ugly angular outline imaginable, often without consulting an architect, and finally we have covered our work with the most flagrant signs and gaudy colors. Is it any wonder that our rural neighborhoods so often lack that element called charm? No amount of artistic and luxuriant planting can conceal our mistakes. Our violation of the essential principles of landscape art has been carried still farther by misplacing our houses without proper regard to the best views and often too close to the street or highway to give any degree of privacy or setting.

However, bad as conditions in general would seem to be there is much to say in favor of our own environment and our best types of cottages. Speaking of environment in a general way no American, especially no New Englander, need be reticent for we have as fine a natural setting from a scenic point of view as any people in the world. The charm of American native scenery cannot be excelled, and we are blessed with a brilliant climate to set it off and in which to enjoy it. Our country is builded on a large scale, consequently we find our homes and gardens treated in a broad way. We care more for wide open front lawns and less for seclusion than do the English as ours is a larger and more democratic country.

I do not believe in importing English and German cottages and gardens into America, but I do encourage the recognition of and

adherence to our own best types. Take for example the old colonial houses of Massachusetts, the old half-stone Dutch types of New Jersey, and the charming old stone houses of Pennsylvania, all of them with unique and characteristic settings. To the present day nothing has been built in this country to excel them. They should be studied extensively and adapted to modern needs and conditions. These cottage types if placed amid luxuriant lawns and gardens would give us as fine cottage homes as any in the world and they would have the openness and simplicity typical of the best American life.

But how can these results be obtained? If one is fortunate enough to be able to begin at the very beginning and select his own location, style of cottage, and the size of his gardens then there need be no excuse for anything but the very best results. But on the other hand when one has to tidy up, repair and renovate, the task is more discouraging in many ways though often the remodeled place is the most charming as it enjoys the softening effects of age which few new places can possess.

The first and last requirement of a finished landscape or cottage garden is neatness. It has been said that anything out of its proper place is dirt. This then includes all the atrocities so often found in our front yards. Dog kennels, chicken runs, stone piles, old fences, superfluous arbors with no architectural connection to anything, mounds, brush and half dead trees, all must be removed at the outset, if anything like a homogeneous result is to follow.

Let us now consider the work before the new home builder. If he can possibly afford it he should first get a competent landscape artist to locate the house, paying especial attention to the best views from the living rooms, the placing of the dining room on the east and south to get the morning sun and the general arrangement of the rooms to secure economy of time and space and at the same time get the most service from them. The proper drainage must be considered and the proper segregation of the service areas. Then get your own ideas about the house in concrete form on paper and call in an architect to criticise and perfect the design of the house.

The landscape architect should then prepare a complete plan for the whole place whether you can carry it out at one time or not.

At least you will not be obliged to alter and adjust your general arrangement in the future when you finally build a tennis court or a garage.

The cottage should be constructed of permanent and if possible local materials to add to its appropriateness and economy in case of addition and repair. Let me warn the home builder not to build larger than he can maintain well, for a well-kept cottage and garden though small forms a perfect picture while the larger and untidy effect is a disgrace. When we have gotten our field or canvas clear, whether we are building a new garden or remodeling an old one, we can at once proceed to the composition of our lawn and garden areas.

The American idea of the large open semi-public front lawn and a screened flower and kitchen garden in the rear where the family can feel absolute privacy is very commendable. In providing for the most attractive views and outlooks both to and from the house it should be remembered that the home is primarily intended for the enjoyment of the occupants rather than for the passer-by. The front garden or lawn adds to the park-like effect of the street and forms an adequate setting to the cottage when tastily arranged and planted.

Where the house is placed close to the street and space in the rear is limited it is best to place a neat fence or hedge along the sidewalk giving protection and a certain amount of privacy and at the same time, when done coöperatively by neighborhoods, adding to the finish of the street.

When of sufficient size the fine open green should be the main feature of the front lawn and this when surrounded by flowering and native shrubs gives us a very pleasing picture. The composition and arrangement of this front lawn requires the exercise of the best artistic taste.

The following directions may be found helpful:

1. Do not plant for show, but use a few varieties in large numbers planted and spaced generously and with precision, giving a dignified simplicity.

2 Frame the cottage in with foliage masses. The lines of the house will be softened by planting shrubbery and flowers at the base as well as vines on the walls.

3. Use specimen trees and shrubs sparingly and then only as accents, as a painter uses his high lights and deep shadows. Do not

spot up a beautiful green with freak imported plants and trees. It is bad taste. Individuals of the group may be somewhat isolated at times to allow for the full development of the type.

4. Group trees carefully so that they do not form uninteresting lines or masses. Arrange them to give vistas and settings from and of the cottage.

Turning our attention to the plan of the garden itself we must first consider the scale and proportion not only of the area at our disposal but of the cottage itself because the grass areas, walks, flower beds, and the whole composition must be in pleasing harmony of line, space, and arrangement with the house and the size of the property. In order to get the best coherence in the design of the whole garden they must be very closely coördinated with the main architectural lines of the cottage unless it is more or less informal in style. In this case lines will not bear such an importance as areas and spaces.

It must be remembered in all formal garden work that they are really outdoor living rooms, planned in proportion to the house but on a broader open scale as they need give the feeling of light, air, and sunshine as well as brilliancy of color.

In determining the character of our gardens you must not lose sight of the fact that usually we must look at them the year around, winter and summer, so it is highly important that we not only have the beds in the garden filled with continuous bloom throughout the summer months, but we must consider the winter aspect of our home surroundings. We should bear this in mind when we decide on the size of our flower beds as they are sure to be more or less unattractive in winter. However, if plenty of grass is provided, the beds neatly cared for in the fall, and a variety of color and interest given to the borders of trees and shrubbery we need have no cause for monotony or untidiness during any month of the year. In fact if we have given the winter aspect of our fruiting and brilliant colored shrubs proper consideration our garden will be a joy throughout our longest winter.

As a general principle to follow it can be said that we can make our gardens as simple as is compatible with convenience and design. Only those walks that are absolutely essential to the design should be permitted and those should be of grass or of some native material. All walks whether in the more formal garden or a more naturalistic

one should be direct and when possible straight unless in very informal work. Where the space for the garden is somewhat limited and one wishes to raise a few vegetables for table use it is well to combine the flower with the kitchen garden. The flowers can be placed along the borders and main walks leaving the interior space for kitchen planting. Often very charming effects are obtained in this way.

When the space in the rear of the house is limited leaving only the regulation backyard so common in our towns and cities there should be an effort made toward neighborhood coöperation with the idea of a series of garden plats in a big open center with small areas directly in the rear of the house reserved for service and utility including laundry yard, etc. This small area may all be paved or a border of grass and flowers planted to relieve its severity. In the large open center in place of the hideous high board fences now so prevalent, we would have a series of thrifty vegetable and flower plats, each property owner being assigned to his share to cultivate as he will.

Often in developing new grounds or remaking an old one certain peculiar or unique natural features are met with and if handled skilfully form the main theme or motif in the home pictures.

Several or even one fine tree if correctly located should be allowed to dominate the whole lawn scheme. Do not plant more small and insignificant trees and shrubs near such a specimen as they accentuate their youth and lack of dignity thus breaking up the simplicity and repose of the place.

A rocky ledge may be the means of producing many picturesque effects. Do not attempt to smooth off fine rugged rocks, accentuate them if anything, thus establishing their meaning frankly. Embellish rocks where existing by such plants as nature grows near them, adding as many of the flowering varieties as will thrive under the conditions of climate and moisture.

I have seen a brook running in close proximity to a cottage that has given more artistic setting to the home than any amount of careful planting could possibly produce. Its borders were planted with nature's best brookside plants such as iris, forget-me-nots, mint, lilies, alders, willows, and dogwood, giving a variety of interest the whole year through.

Often a bare retaining wall or steep bank can be converted into

a mass of beauty simply by planting such climbing and trailing plants as *Forsythia suspensa*, matrimony vine, honeysuckle, bittersweet, and roses.

In many of our rural and suburban towns, homes are being built in what was an unbroken forest. Here it is a mistake to cut extensive openings especially in the background. Let the cottage fit into its environment by allowing groups of trees to nearly enclose the house. Of course trees should not be allowed so near the house that they prevent the circulation of air and the admittance of the proper amount of sunlight. When we have such a natural woodland effect we should increase it by natural plantings. Masses of native shrubs in the margins and snow-drops, crocuses, and violets, etc., in great colonies throughout the lawn among the trees even extending into the thicker wood will give to the spring months a charm peculiar to the best natural treatment.

Many places are not large enough for any special flower garden as such so it is often very effective to plant perennials along the edges and among the shrubbery giving a very informal and free treatment to the whole place. Borders of flowers jammed full of bloom between the walk and the base of the house make the home seem much more cheerful and gay, a characteristic too rare with us.

To many the choice of colors in a garden is most important but I do not consider it among the chief factors of a successful garden though a garden must have color and plenty of it, yet the choice of certain combinations of color in my mind is not the chief essential in garden making. Some of the most charming of our old New England gardens can scarcely be said to have any definite color scheme. Yet people have written books on this subject. The very fact that people are afraid to use color freely has taken individuality and brilliance from many a garden. There are a few things in color arrangements to avoid and a few principles to bear in mind which if followed will give us pleasing effects.

1. Use plenty of white, gray, and green in among your flower masses and there can be but little discord as these are great harmonizers and soften the effect of brilliant colors.

2. Use as few colors as convenient and treat these in big broad masses, a single variety or kind in a bed or section of the garden.

3. Get the purest colors and use but a few oddities in shades and tints.

4. In arranging colors consider the composition you are making. Do not mass your most brilliant tones in the middle of your picture unless seen at a great distance as it will tend to split the composition of color.

5. Almost any color with white forms a pleasing combination, especially blue and pink.

6. Mass one or two colors together and you will get a broader effect by using a number of plants of each variety and the result will not be spotty.

7. Alternate the earlier blooming plants with later ones bearing in mind the resulting combination of color.

8. Arrange your borders so that the higher plants are placed in the rear far enough back to be seen at an advantage.

9. Experiment with various combinations from season to season always striving for a more perfect result.

One should realize that a garden is never finished. It changes from year to year and the character of these changes largely depends upon the care and attention given by the owner. It would require a book to thoroughly discuss these matters of preparation and maintenance, but all we can do is to call attention to the more salient features.

Too much emphasis cannot be laid upon the necessity of deep and thorough cultivation and grading of the soil before the plants — whether trees, shrubs, or flowers — are put into the ground. The results will justify additional care and preparation many times over. Plenty of rich plant food must be provided as flowers and shrubs are great feeders and respond loyally to such treatment.

At this point a word on grading would not be inappropriate, as often, especially in informal work, the entire success or failure of the whole place depends upon the artistic and practical grading of the lawn areas. Grading demands the resources of both the artist and engineer. In many instances a particularly apt and pleasing contour of lawn forms the chief and fundamental beauty of the grounds. This is an important subject which should be discussed at greater length so let no one think that any contractor or laborer can attend to his grading for it is in a real sense a fine art.

One should never allow the high standard of maintenance to lower, but should keep everything trimmed and growing, making the upkeep less expensive. Never allow bare spots in the flower

beds during the summer, but fill up the spaces with such annuals as sweet alyssum, verbenas, asters, zinnias, *Phlox Drummondii*, heliotrope, ageratum, petunias, snapdragons, coreopsis, etc.

Our object in this paper is to give the general principles in laying out and making a cottage garden, to arouse interest, and to give a few essential details to follow at the start. Then the individual can and ought to use his own originality and imagination in getting pleasing effects. Remember you are making a home garden not a cemetery so you need n't be afraid to use color to give life to the place. Experiment with different combinations of flowers and shrubs and move them about from year to year. Perennials as a rule do much better if moved and separated from year to year.

Do not think that because you have but a small area at your disposal that you cannot have a garden. Some of the most charming gardens both abroad and at home are those of the little roadside cottages, where only a few square feet are available, where every inch has its bloom, every rock its fern, and the whole overflows with beauty and charm and invites you to linger and become friends with it and its master. "There is no place," says Guy Lowell, "so small, no rock so barren, that it cannot be made to bloom."

With a profusion of flowers and immaculate care our cottage gardens need be second to none. Our climate gives us a more brilliant bloom than that of England with a much shorter season. This short season can be lengthened by alternate planting and the use of annuals so that we get a continual bloom from the early snowdrop to aster and chrysanthemum time.

In this way our rural and suburban cottage homes will retain their best blood as the attraction will be stronger than that of the large business city. Delightful and charming environment immediately about the home will do more in my mind to strengthen the home tie than many other inducements.

Just for our own sake we should strive for the most attractive surroundings for our cottage homes. Our pride and self-respect demand it and as we grow individually we develop nationally.

When we realize this ideal visiting friends will more than ever wish to tarry along the way and enjoy the innumerable glimpses and vistas of the charming cottage gardens of Massachusetts.

GARDEN FURNISHINGS.

By Prof. Frank A. Waugh, Amherst, Mass.

Delivered before the Society, January 30, 1915.

A garden may be considered from two different points of view. It may be an integral part of the home, used and enjoyed like any other domestic unit, such as the library, the sitting room, or the kitchen. On the other hand it may be regarded merely as an ornamental exterior. Unfortunately in this country the latter view has largely prevailed. The garden has been considered a mere embellishment, an external ornament. The idea of making the garden a part of the home, of living, playing, working, eating in it, is only beginning to find its way into the best society. Obviously the garden ought to be more generally put to use and less commonly left to the doubtful admiration of passers-by.

These different views of the purposes of a garden lead to very different methods of design and treatment. If a garden is to be part of the house it must first of all have privacy. We cannot live our family life in the garden if the spaces are left open to the observation of all the neighbors and of strangers passing in the street.

Such privacy is secured in old-world gardens by high walls of brick or stone. It is not feasible in this country to adopt such exclusive habits, but at any rate we can do much in the direction of domestic privacy by simpler means. Hedges and screens of trees and shrubbery are the most natural and often the most effective means of shutting in the garden and shutting out the world.

After a certain amount of privacy is secured the garden next needs some furnishings. An unfurnished garden is as dreary and hopeless as an unfurnished house. Nothing could be less domestic and inviting than an empty dwelling house; but put a rag carpet on the floor, two chairs and a table in the room, with a picture on the wall and curtains at the windows, and the place has all the physical equipment of a home. If there are sympathetic human beings to inhabit the place nothing more can be required.

Now our American gardens are largely unfurnished. They have reached exactly the same stage as the apartment house when it is ready to rent. There are the hard-wood floors, the plumbing, and the paper on the wall; all the furnishings necessary for family life, for human comfort, for interest and entertainment are completely lacking. Our common talk about gardening completely ignores furnishings, concerning itself simply with trees, shrubs, and flowers, which at best are hardly more than the pictures on the wall.

Extensions of the House.

The point at which American life first breaks through toward the garden is on the family porch. We often talk about porch life, which is a kind of outdoor life halfway between the garden and the house. At any rate there are many families who are unwilling to shut themselves up quite within the four hard walls of the house, and who find some release and refreshment by taking tea on the porch. They even read and visit there, play bridge, or smoke a corncob pipe (according to sex). Many progressive people even have sleeping porches whereby they project the daily life halfway into the garden.

Now this porch life simply represents one stage in progress. The next and natural stage would be to move further into the grounds and to get more of the sky. Also more of all the joys and satisfactions of outdoor living.

In modern garden magazines we read a great deal about pergolas. As I understand a pergola, it is an architectural figure primarily designed to connect an outlying architectural element with the main house. It is a distinct extension of the dwelling house. It should furnish more or less shelter. Its whole tendency is to carry domestic life farther into the garden. Of course we must allow that, as fashionable pergolas are designed, they do not always accomplish this end, but I am suspicious that the pergola has not always been fully understood by the architects who did the planning or the suburban dwellers who paid the bills.

It is hard to tell the modern fashionable pergola in all cases from the old-fashioned arbor or summer house. My own notion is that

there should be a difference in that the arbor or summer house should always be a detached unit at some little distance from the main dwelling. Whatever the name of this detached shelter, whatever the architectural style, whether simple or elaborate, whether cheap or expensive, its real purpose should be perfectly evident. It is to supply another attraction in the home grounds. It should serve as a place where people may stop and find rest, shelter, and an outlook upon the beauties of the garden. It should be in its way quite as useful a part of the home as any room in the house. In it we might carry on many of those pleasant domestic diversions which now occupy the porch. We may play cards there or have supper, or visit with the dog. A man might even meet his children there and become somewhat acquainted with them.

The fact is, that many of these different architectural garden features differ from one another chiefly in their names. Their purposes are exactly those already described. That is, they serve to ornament the garden, to add interest to it, and to give opportunity for various daily activities outside the house, but still within the home. Thus, if we were to speak of the tea house in the garden it need not be anything essentially different from an arbor. It may mean that we will serve tea here on all pleasant afternoons during the summer, or it may not. There would be no objection of course to a quilting party in the tea house during the afternoon, or some polite spooning of evenings, if the girls happened to have beaux about.

In like manner the garden shelter may be called a music house or a studio, if members of the family have musical or artistic tastes. Or the place may become a children's play house, and may indeed be designed primarily for their enjoyment. If the place is so fortunate as to abut upon a lake or practicable stream, the family will of course want to keep a canoe or a motor boat or a cat boat, and these would call for a boat house, which may in its own way become the center of the outdoor domestic life. Where the water is lacking for boating, there may be such semi-outdoor sports as bowling to be provided for, or a small shooting gallery may be established. In fact anything which will add interest to the outdoor life about the grounds is to be considered a part of the garden and to be provided for frankly in this way.

In some of the old gardens there are attractive temples. Now a temple is merely an architectural shelter which adds interest to the place, and which is called a temple largely by way of politeness. In order to make a temple of an ordinary garden shelter it was necessary to introduce a putative god or traditional goddess. Usually a small effigy of Mercury or a trivial bust of Venus would answer this purpose. These pieces of statuary might possibly be worth going out to the garden to see, even if not to worship. At any rate they would supply a point of interest, of pictorial effect in the garden, and would at the same time provide an excuse for a garden visit whenever guests dropped in.

A pavilion is simply another name for a garden shelter where the bust of Venus is lacking, and where it does not seem poetically desirable to call the incident by another name.

Then there is the gazebo. This is a delicious name and worthy of introduction into the garden whether the thing itself cuts any figure or not. My own understanding is that gazebo is middle-period hog-Latin for an outlook. It marks a point of vantage from which an exterior view may be secured. There are often such points of special vantage within the garden, and they should always be marked by some means, as by a seat or a sharp turn in the path, or most emphatically by a gazebo. After all this is nothing much different either from the arbor, summer house, tea house, studio, music house, or other garden shelter.

Tables and Seats.

The creature comforts of life depend largely upon seats and tables. If the garden is really to be inhabited, there must be places to sit. Perhaps the most necessary furnishings of all are seats. In this respect our American gardens are sadly unfurnished. Such few garden seats as we see are obviously intended for ornamental effect and not for comfort. I remember well the German garden of Willy Lange, instructor in landscape gardening, who lives in one of the suburbs of Berlin. In his snug little home-garden of about an acre there were nine different stations furnished with seats, and at six of these convenient stops tables were added. No one could

visit the garden without lingering somewhere to sit and chat, and usually to have a plate of cakes and a bottle of wine. This garden was meant to be lived in.

Tables and seats therefore ought to be furnished in plenty in every garden just as they are inside the house. They should be placed at the most effective points, that is, the points of best in-look and outlook. There should of course be seats and tables in most of the garden shelters whether those shelters be called tea houses or studios. There may be seats and tables under shady trees in sequestered nooks, and at all points where fine views are to be seen.

These seats and tables may be of any character. The fine classic marble tables and seats which we see especially in our American formal gardens are not to be criticised. They are perfectly good in their way. We ought to have more of them, and better ones. At the same time it must be admitted that they are not very comfortable for use, and what we are thinking of now is more particularly seats and tables which may be used with the greatest possible creature comfort. The rustic chairs and tables of the past generation were almost as useless from this standpoint as the Italian marbles of the present fashion. What we need is something plain, substantial, attractive, and above all, comfortable.

Water Features.

Several styles of landscape gardening have insisted strongly upon the introduction of water into every garden. The famous Italian gardens practically never omitted the water features. It is said that the classical Japanese gardeners insist upon the presence of water in some form in every garden scene. We all know how greatly water adds to the charm of every garden, and we may well make suitable sacrifices in order to secure such great advantages.

Whatever form the water may take, it adds materially to the interest and often to the practical comfort of the garden. Every place which is fortunate enough to have natural ponds and streams has therein a very great resource. Such features should be played up for all they are worth. They should be developed not merely

for the artistic effects which they will produce, but for the practical satisfactions which they may bring into the daily domestic life in the garden.

Old garden wells have very little practical use in these days of the city water supply. Nevertheless the well curb may be a most effective artistic feature in the garden, and it would seem too bad to discard a once useful well when so much sentiment and beauty can be saved with it. Beauty and sentiment are indispensable graces in every garden.

Then there are fountains. Perhaps the fountain is the most effective way, pictorially speaking, of presenting water within the domestic garden. It appears that our American ideas of fountains are highly inadequate, being founded chiefly upon the cast iron squirt-guns and dribbling geysers introduced 100 years ago. It requires a fairly good designer to make an artistic fountain, and features of this emphatic character should be introduced into any garden with great care. A really successful fountain, however, is a joy forever, and no opportunity should be omitted which might yield a good result in this character.

We may speak a special word for bird fountains. A water offering satisfactory to the birds can be made without enormous expenditure for engineering or for the services of a sculptor. Inasmuch as birds are a most attractive embellishment to any garden where they may be brought in, and as the bird fountain may be an attractive feature also in itself, this idea is worthy of special study.

A quiet pool, either formally or informally treated, may become also a most attractive feature of any garden. It offers an opportunity for growing many beautiful plants which otherwise would be inadmissible, it multiplies the garden picture by its reflections, and in every way it brings into the garden those gracious sentiments and sympathies which are most required to make the garden a success.

Purely Ornamental Features.

After all is said and done, a garden is partly ornamental as well as useful. It must be beautiful and full of pictures. In building up these pictorial effects it is often desirable to introduce furnishings

of a purely ornamental character, and such as do not have any justification in actual utility. Garden statuary has always been a subject of consequence. While statuary has been used mostly in formal gardens it can also, with some careful study, be introduced effectively into informal gardens. It is quite unfortunate that the art of the sculptor is so poorly patronized, and consequently so meagerly developed in our country. If we were able to have appropriate statuary at the prices which common people could afford, we could readily add much of interest and beauty to our gardens from this source.

Simple columns of stone, marble, or even of wood, serve to add effect to certain points in gardens. This applies especially to the design of formal gardens, but is open for consideration elsewhere.

The sun dial has come to be a favorite fashionable garden feature. The gazing globe is just as useful and sometimes more attractive, though there seems to be less literary interest in it. Then at various places throughout the garden we may use vases and bowls of all sorts for potted plants, formal trees, and other purposes.

A bird house may become a striking and attractive feature of the garden; and if we undertake a definite campaign for the attraction of birds this would be a very natural line of development.

The garden gate is such a pretty and sentimental thing that one only has to mention it to commend it. In fitting the garden with those accessories most compatible with human life and enjoyment, there should be now and then a pretty gate. If it is at the same time thoroughly practicable for purposes of flirtation, this need not be counted against it.

Every garden must be furnished with walks. There must be means of access and circulation. The American policy always has been to subordinate the walks as much as possible. While this is perhaps a sound principle, especially in gardens of informal design, it must not be carried too far. Garden walks are useful, indispensable. They must therefore be well made, and as far as possible must add to the beauty of the grounds.

Materials and Manufacture.

Garden furnishings of all sorts have been rare and expensive in this country. The expense of getting good furniture has accounted in many instances for the unfortunate conditions of which we have already complained. Of course it is impossible to get the finest kind of statuary, the best kinds of fountains or beautiful marble seats except upon payment of relatively large sums. Such payments would be wholly justified in many cases. They would not be out of scale as compared with the cost of similar furnishings inside many homes.

But for common people, and especially for everyday use, a simpler and more practicable style of garden furniture is much to be desired. In a rough and very general way it may be said that a good deal of this should be made up from plain native lumber on the grounds. White pine, spruce, hemlock, oak, and chestnut, in fact almost any of our native lumber will serve this purpose. The design should be simple and comfortable and strong. The furniture should be built in such a way that it will stand the weather and still retain its beauty and utility. Very often it will increase in beauty as it weathers, and will month by month and year by year grow into the garden scheme.

Some of the fashionable garden furniture is made of nicely dressed lumber and painted or enameled white. Such pieces, if well designed, are extremely effective artistically. They can be freely used, though they must be handled with care. In many situations however, it is quite as practical to make furniture of heavy rough lumber in the undressed state, leaving this to take its own color by weathering, or staining it with dull neutral stains. Considerable ingenuity and practical sense are required to design and build furniture of this sort. It is a field in which American gardening has not experimented sufficiently. We need to be shown more good designs of practical garden furniture. After we have talked about this matter and have seen as much in the illustrated magazines about it as we have on the subject of shrubs, trees, and herbaceous perennials, we will know a good deal more about it than we do today. We will then be able to design a garden which has life and interest in it, and which is so full of creature comforts that nobody will want to go into the house even to eat or sleep.

PRACTICAL MANAGEMENT OF THE HOME FLOWER GARDEN.

By Prof. A. H. Nehrling, Amherst, Mass.

Delivered before the Society, January 30, 1915.

The beginning of spring brings on the more important operations essential to the future success of the garden. Some things simply cannot be done at any other time and others are accomplished at a disadvantage later in the season. These spring gardening operations, however, must, to a certain degree, be carried on through the season until the beds and borders are covered for the winter. A good many of these details seem very simple, still, success will be marked by strict attention to them.

After the site for the garden or border has been selected, a careful study of the soil type should be made as the various types of plants require different soils if they are to be brought to a state of perfection. Annuals require a soil that absorbs heat readily and one that is well drained. This same type of soil is also adapted to the culture of bulbs that flower and ripen their leaves early in the season. Lilies thrive best in a light moist well-drained situation and in a soil that contains plenty of humus. Bedding plants, such as geraniums, cannas, etc., should be planted in rich soil, containing a large amount of organic matter. If the surface soil is very poor a foot or a foot and a half should be removed and replaced by two parts of fibrous loam and one of well-rotted manure. Herbaceous perennials, with but a few exceptions, are not so particular as to their soil requirements. Any good soil that is retentive of moisture and will not dry out too readily during hot weather will give good results. No matter what type of garden flower is to be grown, the soil must be fairly rich, rich enough to grow a good crop of vegetables.

When the location of the garden has been decided upon the soil in the beds or borders will require thorough preparation. In the perennial border where the plants are to remain for some years,

special preparation of the soil is necessary. Here the soil should be worked at least to a foot, if possible eighteen or twenty-four inches, especially if plenty of good manure may be incorporated. This deep method of preparation is known as trenching by the English gardeners and it is merely deep preparation of the soil. The soil is thrown out of the bed or border and manure placed in the bottom of the excavation. The neighboring soil is then filled in on this manure and more manure placed in the bottom of the new excavation. This method of procedure is followed until the entire border is worked over when the soil first removed is used to fill in the last opening. For sweet peas a trench from eighteen to twenty-four inches wide, prepared according to this method will give excellent results as the roots penetrate deeply into the soil. The work of trenching should be done in early autumn where possible so that effects of frost, rain, and air can exert their fullest influence on the soil.

Where the soil is to be prepared according to the ordinary method manure or other fertilizer may be scattered over the surface and thoroughly incorporated as the soil is turned. All large clods must also be broken up so as to leave the soil in a mellow condition.

To have a successful flower garden it is not only necessary to have the soil well prepared but fertilizers must also be added in order to furnish the amount of plant food necessary for the best development of the plant. For the border or formal garden, well-decayed barnyard or stable manure is the most suitable material. Where the ground is prepared in the fall or when the bed or border is trenched the manure need not be thoroughly decayed. Other forms of manure such as sheep and hen manure may also be used. However, they are much stronger and must be used more cautiously. It must be borne in mind that these natural manures do not afford the necessary elements in the proper proportion and so must be supplemented with commercial fertilizer. When natural manure is used the elements most likely to be deficient are potassium and phosphorus. The former may be added as potassium sulphate, kainit, or unleached wood ashes. Phosphorus is best supplied in the form of acid phosphate, raw or steamed bone, or Thomas phosphate powder. In the preparation of the garden or border these fertilizers are best applied at the time the trenching or spading

is done so that they may be thoroughly incorporated into the soil. As they add only food stuffs to the soil without appreciably affecting its physical character it is best to use them in conjunction with natural manures.

The next step in the preparation of the garden is the smoothing of the surface soil. This work should also be carefully done, the ordinary garden rake being the best implement to use no matter whether the soil has been spaded or trenched. After raking the soil should be fine, mellow, and loose, so that the ordinary planting may be done without the aid of a trowel.

Garden flowers are propagated either by seed, cuttings, or division. The group of plants known as annuals are always grown by seeds. They may be started in flats or pans, indoors in March, and transplanted to the garden or they may be sown directly into the beds or borders. The tender bedding plants are commonly grown from cuttings; this, however, is rather a difficult method unless the proper conditions for the development of the young plants can be supplied. A number of our common garden flowers are propagated from root cuttings. This method consists of detaching portions of the roots, cutting them into lengths of about 1½ inches and inserting them in rows in shallow boxes or pans of sandy soil. This may be done from November to February, starting the cuttings into growth in a temperature of about 50°. Hardy phlox, stokesia, gaillardia, statice, oriental poppy, Japanese anemone, and senecio are a few of the plants which may be propagated in this manner.

Division is a method of propagation often resorted to in the culture of garden flowers, and it is a very simple and practical method, especially for herbaceous perennials. A good time to carry on this operation is when the plants begin to show signs of decline and by doing this, division of the plants serves a dual purpose. It not only gives the gardener an opportunity to increase his stock, but also gives him an opportunity to rearrange his border and correct any mistakes such as color clashes which may have occurred. There exists considerable difference of opinion as to the best time for dividing and rearranging perennials, that is, whether it should be done in the spring or fall. Such plants as peonies, phlox, and iris may be successfully divided in the spring

providing it is not delayed too long. In dividing, dig up the clump and cut it into two or more parts, keeping in mind that each division must have a stem and roots of its own. The soil should be prepared deeply, enriched with manure, before the plants are reset, allowing sufficient space between individuals to obviate the necessity of again shifting them within the next two or three years. All perennials, as a rule, unless handled carefully, are likely to bloom less profusely the first season after dividing and shifting, but in subsequent years the increased flower production will more than compensate for the loss sustained during the first season.

After the garden has been planted, there are many things still to be done in order that it be a success. These details are best grouped under general maintenance or care of the garden and they comprise such operations as transplanting, watering, weeding, cultivating, staking, cutting, pruning, and mulching.

Where plants such as annuals are sown directly into the border they will need thinning out and transplanting. At this point it might be well to caution against thick sowing of the seed. The common statement, "do not sow too thickly" means little to the amateur although it is well understood by the gardener. Fewer mistakes will be made if when sowing seed it will be kept in mind that every seedling should have room to fully develop its seed leaves without hindrance from its neighbors. However, the plants cannot be allowed to remain so close together after they become established. If all were allowed to grow, the struggle for existence would be great and all the plants could not develop properly. Thinning, therefore, must be done after the plants become established, and the distance that is to be left between the plants will depend upon the variety that is being grown. The seedlings that are removed from the rows may be transplanted to another portion of the garden in the same manner as plants that are transplanted from the seed box to the garden. If possible transplant in cloudy or rainy weather; press the earth snugly around the roots in order to bring the soil in contact with them. If plants such as bedding plants are transplanted, it is well to water the pots some time in advance as this will allow a ready removal of the ball of earth when inverted and tapped lightly. After transplanting, especially if the soil happens to be dry, the plants should be given a thorough

watering. When large plants are transplanted from pots to the garden or from one part of the garden to another it is well to leave a saucer-like excavation around the plant which will hold the water and also allow the water to drain down to the roots more readily.

Thorough preparation of the soil has not only put the soil in the best condition for the growth of plants but also for the development of noxious weeds. These, when allowed to grow, not only spoil the appearance of the garden, but also hinder the growth of plants. Weeds, then, should be removed as soon as possible after they make their appearance. At this point cultivation by means of a cultivator or hoe may be combined with the weeding and this has the advantage of loosening up the surface soil as well. Sometimes it is possible to loosen the soil by shallow spading, but when this method is used care must be exercised that the roots of the plants are not injured. Breaking up the soil by means of a cultivator loosens up weeds bringing them to the surface where they will then dry in the air. Any weeds escaping the cultivator may be removed with a hoe; in fact, where plants are close together this implement is indispensable.

With many of the coarser growing garden flowers it is necessary to stake in order to keep them in an upright position. Where they are allowed to fall over and remain for any length of time it is impossible to stake them successfully as the new growth will have changed its direction. Staking, therefore, should be done when the plants are young, exercising care to keep them in natural positions. Bunching the plants by tying a cord about them is worse than letting them fall over. The best way to stake plants is to drive a stake down along side the plant and then loosely tie the branches to this.

Watering is another important detail and one not well understood by the average home gardener. Frequent light waterings are detrimental rather than beneficial as only the upper soil is moistened, causing the roots to remain near the surface with the result that these die when the soil dries out. For the best results we must water thoroughly so that the water penetrates 6 or 8 inches. If after watering, the surface soil is loosened up, that is, as soon as it can be worked, the moisture can be conserved so that no watering need be done for a week or ten days.

The principal use of a mulch in the garden is to prevent the escape of moisture from the soil, but if manure or some other organic substance is used it also adds fertility to the soil. Of the organic substances well-decayed manure is the best material although grass clippings can be used to good advantage as well as straw or leaves. A dry soil mulch which can be established by keeping the surface soil finely pulverized to a depth of from 1 to 1½ inches also breaks up the capillarity of the soil, and prevents rapid evaporation of the moisture from the soil.

Where the temperature varies a great deal, as is the case in this section, such plants as herbaceous perennials and roses, should be protected with manure, straw, or leaves to prevent the alternate freezing and thawing of the ground during the winter months.

While the operations thus far discussed are of the utmost importance for the fullest development of the plant, the removal of dead leaves and old flowers is necessary in order to keep up the general appearance of the garden. Insect enemies must also be exterminated and fungous diseases controlled if the garden is to be a success. Eternal watchfulness to all these details is sure to bring results.

THE HOME VEGETABLE GARDEN.

By H. F. Tompson, Amherst, Mass.

Delivered before the Society, February 6, 1915.

The home vegetable garden is not a luxury, it is not a necessity, it is a pleasurable economy if you have in your bones the normal person's love for "just seeing things grow." In planning for this garden, consider these things: grow just those kinds of vegetables that your home folks like, buy the best seed you can buy, select those varieties which are characterized by quality, make the soil of the garden rich, keep it well cultivated, plant the short season vegetables in succession so you can have them to eat at their best, and learn the characteristics of the vegetables you are going to grow. If you will do these things your garden will mean pleasure, profit, pride, yes, and popularity, provided your neighbors benefit by your surplus.

No small part of the fun from your garden will come in the planning. Sit down some evening soon and settle some of these important questions. Pick out the standbys: the tomatoes, sweet corn, radishes, lettuce, and all those other vegetables which make you feel richer after a delightful meal. After you have set them down, without any law or order, just as you have happened to think of them, get out a seed catalog from some good reliable firm and look over the lists. You will find some kinds specially recommended for quality; make a note of these. If you cannot decide, consult your seedsman, or the bulletin on home gardening from the Massachusetts Agricultural College, and list one or two varieties, an early and a late, perhaps, that you want to grow. Then consider your area, the size of the home appetites, the yield to be expected and you have the fundamentals for your plan.

There are over thirty of the common vegetables every one of which can be grown in any home garden. With this wealth of material and opportunity, no homes where a plot even 10 × 12 feet is available should be without some home garden vegetables.

Vegetables are easy to grow, some much more so than others, but some degree of success is within the reach of everybody. To reach their maximum quality, they need rich soil, plenty of moisture, protection from insects and disease, but to be better than those you get from the store, they need be only as you all can grow them.

The garden spot is best on light loam soil, but even an ash filled yard can be used. It is best made fertile by the use of an abundant supply of animal manure, stable or barnyard manure, but leaves, grass, or any other decayable plant refuse is valuable for this purpose. Two hundred and fifty pounds of manure to the square rod is a good liberal dressing, and may be applied whenever convenient and spaded in. Preferably this work should come in the late fall. The supply may be spread in the winter, if the ground is level, or in the spring, and spaded in.

In the spring when the frost is out of the ground and the soil is dry enough to crumble when forked, the garden work should begin. The large garden can best be plowed, the small one spaded. Two objects are in view, one, the placing underground of the material which is going to furnish plant food and improve the soil conditions, the other, the loosening and warming of the soil, the breaking up of lumps and making mellow.

After the spading and before the raking another addition can be made to the garden which almost invariably will give surprising results. That is, the scattering of about 20 lbs. to the square rod of air- or water-slaked lime and raking it in; then add about 5 lbs. to the same area of some good garden fertilizer which also should be raked in. With this treatment, we should be ready for planting time.

To go back to planning time, we have learned that many crops like cool weather, that others must have warm weather; that some grow quickly and in a few weeks produce something good to eat; that we have to wait months for others. Of course the cool weather crops are planted first. Radishes, beets, lettuce, cabbage, carrots, peas, onions, parsley, and several others can be planted by the middle of April (19th). On the other hand, beans, sweet corn, squashes, cucumbers, melons, tomatoes, eggplants, and peppers are tender to frost and need to be put into the garden late enough so that we will not lose them. This is usually after May 15th.

But many of these crops, some in each group, take even several months to give us edible products. If we are going to pick tomatoes in July, some one must plant the seed in late February or early March. If we are going to have cabbage by the 4th of July, the plants must have been growing several weeks before the frost was out of the ground. And so, you see, we need to know the individuality of our cabbages and our radishes, our beans and tomatoes, to get the results we want in our home gardens.

Fortunately for the home gardener, the plants which require early starting can all be purchased at the seed store or corner grocery and put into the garden at their proper season.

If the home garden is a permanent institution, it should include the perennial crops, asparagus and rhubarb, and these should be grouped at one side along with the small fruits. 100 good asparagus plants, well fed and cared for should average from 1 to 2 lbs. of asparagus a day from May 1st to July 1st. Palmetto or Argenteuil is the best variety. Plants should be set 24 inches apart in the rows, rows 4½ feet apart in rich land, the richer the better, with the plants set 8 inches deep and covered gradually. Large one-year-old roots are best to set and they can easily be grown at home or purchased in the open market.

Four to six rhubarb plants will furnish an abundant supply for the average family. Victoria and Linnaeus are both excellent varieties. The rhubarb may be propagated from seeds or roots but it does not come true when grown from seeds, so propagation by root division is most satisfactory. Both of these vegetables are hardy, grow rapidly, yield abundantly if well fed, and will continue, after the 3rd season, to yield suitable crops for 10 or 15 years. The rhubarb should be set with 3 feet between plants and 5 feet between rows.

The portion of the garden occupied by these crops needs only an annual application of manure and fertilizer and good tillage to insure pleasing results.

The garden pea is one of the first of home garden crops both in popularity and time of planting. A succession is obtained by planting early, medium, and late varieties. For first early kinds, Early Morn and Nott's Excelsior are both good, for a later better quality variety, Gradus is satisfactory, while Telephone or Cham-

pion of England are standards for the best quality and the late crop. The early kinds are small and should be planted in rows not over 30 inches apart and from 20 to 30 peas to the foot, covered 2 to 3 inches deep, in a drill 2 inches wide. The later kinds need 42 inches between rows and can be handled best in the home garden by providing some support with bush or chicken wire. They should be planted and covered as recommended for the earlier kinds.

It will make the planning easier if we group together the short season crops which need to be planted at two or more different times to insure a continuous supply. These are, beginning with the quickest maturing radishes, lettuce, beets, carrots, cabbage, beans. With this list in mind we can prepare to find room for successive plantings for each. We expect the radishes to be ready to eat from 3 to 4 weeks from seed sowing, if Scarlet Globe or one of the popular French breakfast varieties is used. To keep a supply coming, for radishes will become strong and pithy when too old, a seeding should be made as frequently as the preceding sowing has broken ground. This means that a sowing should be made every week or 10 days throughout the season. Radishes can be tucked in almost anywhere, if 6 to 8 inches is allowed and the sunshine is not cut off.

Lettuce takes about 12 to 14 weeks to reach that hard headed stage which best suits the housewife, provided the right varieties are selected and the garden soil is rich enough. The variety for the home garden for spring is May King, for summer and fall, Salamander. When the plants begin to crowd in the rows, thin out to 12 inches apart and have rows 12 inches apart. Cultivate well and you may expect good lettuce. Planting every 2 or 3 weeks up to August first is necessary to keep the supply at its best.

Beets and carrots need about 2 plantings, one in April and one in late May. The seed should be put in drills 12–15 inches apart, sown 3 or 4 seeds to the inch, and thinnings made when the plants are 3 to 4 inches high. The beets should be given 4 inches of room apiece in the row and the carrots 3. Thinning to 1 plant in a place is important. Cabbages are grown for a continuous supply by setting plants in early April, of an early variety like Early Jersey Wakefield, followed by a later setting of Succession perhaps,

and again by a last setting, about July first, of the same kind. The seed needs to be planted for these kinds about 6 weeks in advance of the time for setting plants. This crop requires from 18 to 24 inches between plants and 30 to 42 inches between rows, and from 14 to 18 weeks to reach full maturity from plant setting.

With beans we find a great variation in time required to grow between the "6 weeks" kinds to the Limas which require 14 to 16 weeks. Successive plantings of such kinds as Round Pod Wax and Stringless Green Pod make the bean season from the middle of July to frosts in the fall. From 7 to 10 weeks are needed to grow edible string beans and 2 or 3 plantings 2 or 3 weeks apart will keep up the supply. Beans do best planted in drills 24 to 30 inches apart and will grow better in shady spots than will most vegetables. For Lima beans Fordhook Bush Lima is as good as any, but like all beans it is tender and is best not planted until the ground is warm and frosts out of date.

All of these crops which need to be planted more than once can be worked into our garden before or after others so that they fit together a good deal like a block puzzle. Of course different home gardeners plan different combinations as tastes differ. Of this group, radishes and lettuce can be used as fillers where the garden is small and hand tillage the necessary practice.

Others of our garden crops, like parsley, parsnips, tomatoes, salsify, cucumbers, melons, and squashes are permanent boarders. After they are once planted they "stay put" until the season ends. The tender kinds should not be planted until early in May while the hardy ones of this list may be planted at any time from early April until late May. Parsley is a prolific yielder after once established and 6 feet of row will be ample to provide all of this garnish needed. This seed is drilled thickly, covered shallow, and seedlings appear in about 15 days. The young plants are weak but after once established, can well take care of themselves. It is a good plan to start these plants in the house in a box and transplant them to give them an early and vigorous start. One foot between rows is all that is required.

Parsnips and salsify need nearly the full season, a mellow soil, and thick seeding. The former will yield about 1 bushel to 50 feet of row when thinned to 4 inches apart, rows 12 to 15 inches apart; the latter 5 or 6 roots to the foot if thinned to 2 inches apart.

Tomatoes, a standard in nearly all gardens, are set about May 20th, and they may be trained to a single stem, a good method for the home garden, or allowed to sprawl at will. From 6 to 12 well-grown tomato plants will abundantly supply the average home. Try Bonny Best for a choice home garden variety. Trained to one stem and tied to a stake each plant will require about 4 sq. ft. of room; where allowed to sprawl it will need 16 ft. The pruning is done by nipping out the lateral branches soon after they show and tying the main stem, every few inches, to a firmly set stake.

The vine crops need considerable room, and the environs of the home garden, as well as the damage to cucumbers and melons by blight, often argue strongly against the inclusion of these vegetables in the home garden list. The fact that cucumbers are often highly relished, and that, in rich garden land a considerable crop can be had before the blight interferes, makes 2 or 3 cucumber hills worth while. Plant them in some corner or edge where the vines can readily reach over the garden edge. Plant Arlington Improved White Spine or Davis Perfect and put a forkful of well-rotted compost in each hill. Plant from 12 to 18 seeds to a hill and probably you will be able to eat cucumbers in August. Like directions apply to melons and summer squash. The winter squash is such a spreading plant that it is considerably out of place in the home garden.

There are at least two important home garden crops that have not been considered. They are celery and sweet corn. The former requires land rich in humus, an abundant supply of moisture, and more or less coddling, to produce the kind you like to buy. It is the most difficult of the garden crops to grow well and should be practiced on before the gardener boasts of celery for his Thanksgiving dinner. The two common varieties found in the market are, for early, Golden Self Blanching, and for late, the Giant Pascal. Seed is sown in April for these crops, the seedlings appearing after 2 or 3 weeks and growing very slowly. From June 20th to July 1st these are set in their permanent places, in soil filled with rotted manure and they are kept well supplied with water. If this is faithfully done, results will be forthcoming.

Finally room for sweet corn, which is one of the most popular

and most easily grown of our garden crops, must be saved, for several plantings are necessary to give us corn during August and September. Select some one or two varieties which you have found satisfactory or try Golden Bantam or Golden Honey and plant, first about May first, then June first, and lastly about June 20th to keep the supply coming. Corn should be allowed to grow about 3 stalks to a hill, hills 18 to 24 inches apart and rows 24 to 30 inches apart. A good average yield will be 2 ears to a stalk.

It is the best plan to put the vegetables which require an abundance of room, like corn, beans, tomatoes, together in one part of the garden and the close planted kinds like beets, carrots, and lettuce in another part. This makes easier cultivation and a more systematic arrangement. The more closely planted the garden the greater the need of heavy fertilization and abundant water supply. Where the garden spot is permanent a line of overhead irrigation will give a certainty to the water supply which is not only garden insurance but gardeners' satisfaction. One line of irrigation equipment sufficient to water an area 50 × 50 feet will cost only about $8.00, if connected with the public water supply. This needs to be set only on 3 foot posts through the middle of the garden and will water 25 feet on either side. One inch galvanized pipe, a patent irrigation nozzle every 4 feet, a patent union at the end where the water enters are the items of equipment.

Where the minimum of equipment is a primary consideration the garden tools need be only these: 1 round-pointed shovel, 1 spading fork or 1 six-tine manure fork, a 12 or 14 tooth iron rake, a common hoe, a good type of scuffle hoe, and a garden line. Together these should not cost over five or six dollars. If one is prepared to get all the equipment for the home gardening that will be useful, these additions may well be made: the irrigation line above mentioned, one combined wheel hoe and seed-drill, which will cost about $10, 2 hotbed sash, a mat, a frame, together costing about $15.00, and a small spraying outfit. It is possible to spend from $40 to $50 in getting together the equipment which can be used to advantage while one-eighth of this amount will supply the necessities.

The products from the home garden need not cease when the fall frosts come or even when the ground freezes, for several of the

garden crops can be stored well into the winter. This is true of all of the root crops except the small radishes. The needed conditions are a temperature between freezing and 40 or 45° F. and protection from drying out. Almost every house cellar that has a cool corner with an earth floor will prove a suitable place. A bushel or two each of beets, carrots, turnips, parsnips, and a smaller supply of salsify and horse radish can all be put into a corner, when well-cooled off, covered with 2 or 3 inches of earth, and keep well for months when the temperature is low.

Tomatoes can be picked before frost and stowed away to slowly ripen and give ripe fruit during October and November. The well-shaped good sized specimens are the kind to use and these must be handled carefully. Cabbage and celery can be kept for weeks, the cabbage handled much as are the root crops and the celery placed where it will be safe from freezing and the roots set into the soil of the cellar bottom where they can get moisture to keep the plant stems hard and crisp.

There are two classes of pests in the home garden, insects and diseases. Most all growing plants are subject to some one or more of each. It is generally true that the more healthy the plant the less the damage from these causes. Such a pest as the cutworm can be kept from doing damage by putting paper collars about the plants that might be attacked. All those insects that chew the foliage can be killed by putting poison on the leaves, while most diseases can be prevented by covering plant foliage with Bordeaux mixture. The simplest and most satisfactory plan by which the home gardener can protect his garden from insect and disease injury is by spraying with Pyrox, sufficiently often to keep the foliage well covered.

The fundamentals of success in home gardening may well be called to mind again. First, good seed; second, well prepared soil; third, proper planting; fourth, thorough tillage; and fifth, an acquaintance with the nature and habits of the plants which are grown. Thus fortified the home garden is a sure success.

PRUNING.

By Prof. F. C. Sears, Amherst, Mass.

Delivered before the Society, February 13, 1915.

Why is it that almost anyone who takes any interest at all in fruit growing likes to prune? Ask most fruit growers, particularly those who have time to get the real enjoyment out of their work, what they would rather do about the orchard and ten to one will say "prune." One does not need to look far for the reason either. Few, if any, of the other operations call for so much knowledge and such good judgment, and none of them puts you in such intimate touch with your trees. The man or woman who cannot become enthusiastic over the pruning of a tree, especially a young tree, is certainly difficult to enthuse.

Shall We Prune?

As a practical orchard matter the question of whether we shall prune or not is, of course, almost always answered in the affirmative, but there *are* a few men who prune little, if any, particularly on young trees, and the amount of pruning done varies tremendously, some men being very severe and others doing none at all or at least very little. With the young trees there is a "school" of orchardists of fairly respectable numbers who do not believe in pruning at all at the time of setting. They argue that the tree needs all its vitality to recover from the operation of transplanting and that to remove any of the top reduces by just so much the total vitality of the tree.

On the other hand, most growers prune the tree severely when it is set in order to reduce the top to correspond to the reduction of the root system which has been necessitated by digging the tree. This argument has always appealed to me as a sound one and what experimenting I have done along this line has served to

confirm my belief in the practice. I believe, however, that after the tree is established, but while it is still young, say from the second to eighth years, it ought to receive very little pruning. In practice I have tended, during recent years, steadily towards less and less severe pruning of such trees. At the present time all that I would do to such a tree is to take out crossing branches, to look carefully after the development of the main branches and possibly to do a little additional thinning. I think we are likely to overlook the fact that trees of this age, being relatively small in bulk, can afford to remain more thick than trees of larger volume, and it seems to me that so long as we can keep such trees open enough to give us well-colored fruit, the less pruning they receive the better. The most important reason for curtailing our pruning at this stage is the reasonably well-established fact that unpruned trees, or those which at most receive very little pruning while young, come into bearing relatively early.

The past month I had the pleasure of visiting a young orchard in the Annapolis Valley, Nova Scotia, which had been set for nine years. It was made up of Northern Spies and Wageners and the Spies had never been pruned at all. Now the Spy is proverbially slow in coming into bearing and yet some of these young trees bore half a barrel of apples at seven years and at nine years the majority of them were in bearing and many trees gave from one bushel to one-half barrel of fruit. Other instances might be cited showing the same results.

Reasons for Pruning.

If we *are* to prune we ought to acquire as clear a conception of why we do it as possible and most of the intelligent pruning of fruit trees is done for one of the following three reasons:

(1) To control size and shape of the tree. This is the only type of pruning that the writer would do while the trees are young and it varies with our ideals, all the way from the man who merely sees that the main branches are satisfactorily distributed on the trunk and that there are no crossing branches of any size, up to the man who insists that the tree take some specific shape, as horizontal cordon or espalier. As already suggested, to me it is the most

interesting of all phases of pruning for one works out his ideals and coöperates with the little tree to produce very definite and specific results.

(2) The second general reason for pruning is to influence the bearing habit of the tree, to make it bear more or less fruit. Usually it is the former which we aim at, but occasionally we do pruning with the definite purpose of making the trees bear less fruit. This is especially likely to happen with such varieties as Wealthy and Wagener which bear very freely and on which the apples are likely to run small as the trees get older. It is often advisable to give such trees a severe pruning with the idea of starting them into renewed wood growth which will reduce the amount of fruit and increase the size of the individual apples.

(3) The last general reason for pruning is to influence the character of the fruit, to make it better in color, and finer in quality. This comes into play as the trees get older and is the reason which we most commonly have in mind as we prune.

General Principles.

Let us glance next at some of the general principles which govern the pruning of fruit trees. We can do little more than mention them here and yet they must be understood if one is to prune intelligently.

(1) The first of these is that the season of the year in which the pruning is done is likely to influence the results. Where one prunes in summer the tendency is toward fruit bearing and where one prunes during the dormant season the tendency is in the other direction. If summer pruning is to be most effectual it must not be severe, and must consist in a mere checking of the growing tips. The explanation of this result is simply this: Our tree is to be looked upon as a manufacturing plant with a certain capacity in manufactured plant food per day. The growing tips draw most heavily on this output for materials to make new leaves and twigs. Now if we stop this new formation of parts, we have still the same amount of manufactured food and therefore a larger amount for the use of the developing buds and as a consequence these buds can

develop into fruit buds instead of having only materials enough for the less highly developed leaf buds.

In distinction to this we have the effect of pruning in the dormant season. When the tree goes into winter quarters there is a practical equilibrium between the roots and top. If we take off half the tops we have 100 percent of root surface to supply 50 percent of top and the result is that that 50 percent makes a rank wood growth and gives little fruit.

(2) The second general principle is that checking of the growth of the tree tends to make it bear fruit. This checking may be brought about in various ways. One important way is by summer pruning as just discussed. Another is by the increasing age of the trees. As they get older they grow more slowly and consequently bear more generously. The application of fertilizers has a very important effect on production, some kinds tending towards wood growth and away from fruit and others tending in the opposite direction. Diseases almost always tend toward fruitfulness. As the tree becomes decrepit it tends to reproduce itself and so is thrown into fruit bearing.

(3) The third and perhaps most important of these general principles is that the pruning should vary with the kind or class of fruit tree. This is because different fruits bear in such different ways. Apples, for example, bear on short stubby spurs which may live and produce fruit for ten or fifteen years and in that time not make a growth of over six or eight inches. These spurs must, therefore, be preserved at all costs and the pruning is relatively slight. In contrast to this peaches bear altogether on the new wood of the previous season's growth and the pruning must be relatively severe in order to keep up a supply of this new wood. The other fruits vary between these extremes and each requires a little different treatment in order that we may secure the best results.

(4) A fourth general principle is that the pruning must vary with the age of the tree. This has already been touched upon. The young tree may be left with a thicker top and in many cases *must* be so left if it is to develop into the best type of tree. Take young pears, for example, or some of the upright-growing varieties of apples and plums. If these are pruned so as to give the proper

amount of density to the top while *young*, they will, as they get older and bear fruit, spread out so as to make too open a top.

(5) We have lastly the general principle, closely allied to our first principle, that severe pruning of the top at *any* season always tends to strong wood growth, while little pruning or no pruning at all tends towards fruit.

When we come to the actual operation of pruning, there are many interesting details. When shall we prune? How shall we prune? What shall we prune with? Shall we treat the wounds and if so with what?

Pruning Tools.

Naturally the first step for real work is to provide oneself with a convenient and efficient set of pruning tools. There are endless types on the market, but strangely enough, relatively few of them are satisfactory — at least that has been my experience. Perhaps I am unduly particular, but half the satisfaction in pruning comes from having a pruning knife or shear or saw that will do its work in a workmanlike manner. A large knife is to be preferred, one with a large and quite hooked blade. Personally I use a knife very little, preferring a good shear, but there are occasions when a knife will do the work better than anything else. In selecting a shear, buy a good one. That always pays in the long run. $1.00 to $2.50 is well spent for a really good shear. The so-called "French Wheel-Spring Shear," which can be had at any first class hardware store, is the type I have used with the greatest satisfaction. Some people object to a shear on the ground that it bruises the wood so. It does if you have a poor, dull affair; possibly the best of shears will to a limited extent, but only a very little, and this is much more than offset by the greater danger of shaving into other parts of the tree with a knife after the particular branch we are working on has been cut off. A shear is also usually much more convenient to work with.

The last item in our equipment is a saw. Here we are even worse off than with shears. There are almost no good pruning saws on the market. Here again perhaps I ought to plead guilty to being particular, but I want a saw of good steel which is adapted

to the particular work I have in hand, and usually I cannot get it. The situation is so bad that I have had saws made for me on special orders, and three of these saws I want to describe: For heavy work we use a saw of the following specifications — 26 inches long, 6 inches wide at the butt, 1 inch wide at the tip, and 5 teeth to the inch. We have this made of No. 12 steel, the best on the market. This saw has what is called the "regular" handle. For work on bearing trees which have been well cared for, that is where there will be no very heavy work, we use the following saw — 24 inches long, 4 inches wide at the butt, 1 inch at the tip, 5½ teeth per inch. For small work we use a saw with the following specifications — 15 inches long, 3 inches wide at the butt tapering to a point, with 7 teeth per inch. The last two saws have what is known as a paragon handle. With such an equipment one is ready for any type of work and it is a pleasure to do it.

Season for Pruning.

The question of when to do the work is sure to come up and like most other questions depends on circumstances. As already explained there is some difference in effects of pruning at different seasons, but barring this consideration it is my opinion that it makes little difference when we do our pruning. Pruning during the dormant season has two very definite advantages: (1) One can see the shape of the tree much better and (2) there is usually more time for the work. If one is looking for the *ideal* time in which to do this dormant pruning, I should say the last of March or first of April. The wounds have then but a short time to stand before healing begins and one has all the advantages of the dormant season. On the other hand when one has much work to do I consider it entirely allowable to begin in December or even in November. Don't be afraid of pruning while the wood is frozen, at least not so far as the well-being of the tree is concerned.

A maxim of good pruning which is more frequently violated than almost any other is the admonition to cut close to the main branch, to leave no stubs. The proper method requires little if any more work than the wrong one and yet men usually persist in leaving

more or less of a stub when removing a branch, and the stub is always fatal to the best healing of the wound. If the branch is of any considerable size cut it off twice, once a foot away from the tree (to get rid of the extra weight) and then cut it again right in line with the line contour of the branch from which it is removed.

The Dressings for Wounds.

Another question of considerable practical importance and one which is always asked when pruning is up for discussion, is what treatment the wounds ought to receive. If they are at all large, say anything above an inch in diameter, they ought to be treated with some dressing. The ideal dressing should be durable, harmless to the tissues, a good preservative, cheap, and easy to apply. Unfortunately the ideal dressing does not exist. In actual practice we have to choose between paint which is harmless to the tissues of the tree but not a very good preservative, and tar or creosote which are much better as preservatives but damage the tissues. Personally I have used the latter on very large wounds where it was necessary that the tissues be preserved for a long time before we could expect that the wound would be healed, and have used paint on all smaller wounds.

Ready-mixed paint should be avoided since it usually contains turpentine or some similar substance that will strike deeply into the tissues and destroy them. The best type of paint is plain white lead and oil, to which a little lamp black or raw sienna may be added to take away the glaring white.

With the foregoing plans and specifications in mind one may sally forth fairly well equipped for his pruning campaign. But the fun of the thing comes from the fact that each new tree is a new problem to be thought over and solved on slightly different lines from every other tree.

THE CULTURE OF HARDY SHRUBS.

By Arthur E. Thatcher, Bar Harbor, Maine.

Delivered before the Society, February 27, 1915.

When one considers what a large number of people there are who spend the most pleasant part of the year in their country homes it is somewhat surprising that so little attention has been given to the hardy garden and the many beautiful subjects which are suitable for adorning lawns and pleasure grounds. But the rapidly increasing interest which is being taken in all branches of horticulture makes it safe to assume that a much greater use will be made of those shrubs and plants which are capable of withstanding the rigors of our variable climate and which, instead of having to be renewed every year like the majority used for garden decoration at the present time, are enabled to continue giving pleasure year after year with a minimum of expense and yet giving far more beautiful and adequate returns than annual plants are capable of doing. Along the eastern seaboard of North America from Washington to Bar Harbor and inland for some hundreds of miles we have a climate remarkable for its variableness and severity and also remarkable for the fact that in no part of the world do flowering shrubs succeed better.

English enthusiasts when visiting this country are always impressed with the beauty of our deciduous shrubs produced by the well-ripened wood, the result of our warm summers and congenial fall temperature, and though we cannot succeed so well with many of the ornamental leaved evergreens so conspicuous in English gardens yet we have our corresponding advantages. Having been privileged to work for many years in one of the foremost gardens in England, where hardy trees and shrubs received the careful attention of the owner and were a great specialty, and also for several years in that great institution, the Arnold Arboretum, I may claim to have had exceptional opportunities for studying their requirements. Knowing the Boston Arboretum as well as I do

I would like to draw special attention to the remarkable collection grown there and the great facilities it offers for people to learn what are the most beautiful shrubs to plant which will succeed in this climate. In laying out and planting a garden it is a very much better plan to go to such a wonderful Arboretum as this and make one's own notes of the shrubs which will succeed in different situations, than to leave the selection to others. One of the principal reasons why so many shrubberies are uninteresting today is because of the constant repetition of a few well-known sorts and yet there is a great variety of inexpensive material which can be seen at any good nursery and by a judicious selection will add much interest and distinction to a garden.

In making a choice it should be remembered that there are other shrubs than those remarkable for the beauty of their flowers deserving of inclusion. In some, such as the Rhus family, the foliage is very ornamental; others whose flowers may be inconspicuous attract much attention when carrying beautiful fruit; some are most noteworthy when their green mantle has changed to various shades of crimson or gold in the autumn; and others are again desirable on account of their richly colored stems in winter. Many persons in making a selection are apt to attach too much importance to coniferous and other evergreen shrubs and, although I am fully aware of their value when used with discrimination, there can be little doubt that they have been overdone in the past. To produce the most pleasing effects both evergreen and deciduous shrubs must be happily blended, but it should be borne in mind that deciduous shrubs are much more beautiful, less expensive, and give the most satisfactory results.

In selecting material for the planting of an ornamental shrubbery, whether one has a limited area or unrestricted space, it should be borne in mind that one need not be confined to shrubs only of a bushy nature, for while they form the basis of a shrubbery others grown as standards or half standards may be employed with excellent results. A very pleasing method of growing many of the hardy climbers, such as ornamental grapes and roses, is to firmly insert a stout pole into the ground leaving ten to twelve feet above the surface and lightly nailing or tying the long shoots of the climbers to it. The pole soon becomes completely covered. If varieties of suffi-

cient hardiness are employed so that no taking down or covering is required they will need little attention beyond tying up the new growth.

The pole should be sunk into the ground three or four feet so that frost will not loosen it and the buried part should be well treated with creosote or tar which will preserve it for many years in good condition. A good straight larch or cedar pole answers well for the purpose. Many varieties of shrubs are now obtainable in standard form such as the crabs, thorns, maples, particularly the handsome Japanese varieties, and many others which by proper method of pruning are amenable to this form of cultivation.

In one lecture it is obviously impossible to deal exhaustively with all that appertains to the culture of hardy shrubs but I will endeavor to bring to your notice some of the most important matters in connection with their successful cultivation.

All hardy shrubs, except those which are naturally more at home beneath the shade of trees, succeed best in an open sunny position where they receive the full benefit of light and air, and this is particularly true of those grown for their floral beauty. It is important, therefore, to select if possible a position which, while being sheltered from rough and cold winds, is fully exposed to the beneficial influence of the sun. This enables the wood of the current season's growth to become thoroughly ripened and consequently much better able to pass through the winter without harm.

Having selected the position it is of paramount importance that the ground be properly and thoroughly prepared, first by seeing that it is well drained as very few shrubs will succeed in a water-logged soil and then by having it well broken up to a depth of at least two feet. If the soil is naturally very heavy it is a good plan to freely incorporate decayed leaf mold and sand, but if very light and dry in character nothing is better than a good heavy loam. Well-decayed manure will prove of much benefit to the shrubs if it can be worked deeply into the ground, otherwise I do not advocate its use.

All hardy shrubs will succeed in a loamy or peaty soil providing it is well drained and deeply worked, but it may seem to some that it is quite unnecessary to prepare it so deeply as I have advised. It is however highly important, even if the expense is somewhat

larger, for the difference between shrubs planted in ground which has been properly prepared and those in poorly worked soil is quite remarkable, and no one will question the advisability after seeing the results.

When to Plant.

There has always been and probably always will be a difference of opinion as to whether the fall or spring is the better time for planting. If the work has to be done in the fall on account of the rush of work in the spring it is advisable to plant as early as possible when the ground is in a moist condition, directly the leaves commence to fall. For my own part I am strongly in favor of preparing the ground in the fall, letting it lay rough through the winter, and planting in the spring. If the work is well done and the requisite amount of attention is given the shrubs afterwards there is small chance of failure. It is very true that we often have a short dry planting season in the spring but much disappointment is frequently caused by shrubs which if planted in the fall fail to become sufficiently established to withstand the severity of our eastern winters.

Planting.

With the ground in readiness and the material at hand the next operation, that of planting the shrubs, is perhaps the most important part of their culture. So much depends upon how this is accomplished as to after success or otherwise that too much care cannot be taken to have it well done. From whatever source the shrubs are obtained they should be carefully unpacked on arrival and the roots thoroughly moistened and if they cannot be planted for some time they should be laid in a sheltered place away from the wind. It is a good plan to place a stake with the name where each shrub is to go; this will expedite matters when the planting is being carried out. The best time for planting is when the ground is in a moderately moist condition as the soil can then be made firm without becoming pasty and, if possible, choose a calm day as wind has a most detrimental effect upon the roots. A hole should

be taken out of sufficient size to accommodate all the roots after they have been spread out evenly so that it will not be necessary to bend any round or cramp them, and having seen that the hole is of sufficient depth the planting can then proceed. Cut off any broken or damaged roots on the under side with a sharp knife and take great care of the small fibrous ones as on these the life of the shrub depends very largely and see that they are quite moist. Then place the roots in the prepared hole and spread out all of them evenly, working in among them some of the finest soil, pressing it firmly, and adding more until the hole is filled. While the roots should be well covered it is not advisable to plant too deeply, especially on heavy land, and the nearer the fibrous roots are to the surface the greater warmth do they receive and consequently start into active growth more quickly than if buried some distance from the surface. When the planting is completed it is an excellent plan to give the shrubs a good mulching of any suitable material at hand such as decayed leaves or long dressing. This is of the greatest assistance if warm weather prevails for it keeps the roots moist and cool and prevents the surface soil from becoming baked.

Many people are under the impression that newly planted shrubs should be copiously watered at the roots but I consider this unnecessary and oftentimes detrimental. If a good watering is given immediately after they are planted, which will settle the soil about the roots, and a mulching is applied, very little water will be needed for some time by the roots, but it is an excellent practice to spray them overhead frequently. This keeps the wood moist and greatly assists the buds to develop.

If shrubs of standard form are planted they will need some support until they become well rooted, and for this purpose nothing is better than a straight stake, sharply pointed and driven firmly into the ground as near the stem as possible without injury to the roots. The shrub can be secured to it by wrapping a neat piece of cloth or rubber around the stem and tying to the stake firmly with string, but care should be taken that no injury is done to the shrub as the bark expands with growth. Many beautiful American shrubs are notoriously fond of peat and if the conditions are not naturally favorable for their cultivation liberal additions of this material should be incorporated when preparing the ground,

if it can be obtained. Peat, however, is not always available, neither is it absolutely necessary for many peat-loving subjects will succeed admirably in a mixture of fibrous loam, decayed leaf mold, and sand.

The pruning of hardy shrubs is one of the most important matters connected with them but at present it is very imperfectly understood and we see far too often the lamentable results accruing from a lack of knowledge of their individual requirements. All that is generally considered necessary is for an incompetent workman to give the shrubs an annual trimming with a pair of shears with the result that when the work is finished the shrubs all have about the same rounded stiff appearance; much of the old growth which should have been removed is left and forms a mass of useless growth, and the young wood which should be carefully preserved for future blossom is cut away. It is not possible to lay down any hard and fast rule as shrubs differ so much in their individual requirements, but it is better not to prune at all than to prune indiscriminately.

The large majority of flowering shrubs produce their blossoms during the spring and summer months and some of these such as the Philadelphus, Deutzias, and Forsythias, which produce their flowers on wood of the previous season's growth, are improved by having some of the flowering stems cut clear out as soon as the blossoms have fallen. This will help to strengthen the new growths sent out from the base and give them a better opportunity of becoming well ripened before winter sets in. The majority of hardy shrubs, however, require very little pruning beyond occasionally removing the old growth so as to keep them shapely and open to enable them to receive the full benefit of the sun and air. It is only by intelligent study and actual practice that one can become conversant with the requirements of different shrubs.

As I have previously mentioned it is quite unnecessary when planting an ornamental shrubbery to use only those shrubs which are of bushy form when by the inclusion of some of pyramidal growth, for example, and the proper use of standards one can produce a very much more attractive arrangement. A very common mistake, which should be carefully guarded against, is to plant all the larger shrubs at the back and graduate the others

down to the front. By bringing some of the larger shrubs to the front and placing a well-grown standard on the edge of the shrubbery, where it stands clear above its neighbors, one will be able to give the appearance of much greater depth, which is important where space is limited. It will, of course, be necessary when the shrubbery is first made to plant more shrubs than those which can permanently remain. In the course of time as the different varieties develop and assume their mature form a certain amount of thinning out will have to be done. I do not mean by this that the shrubs should be thinned by cutting back or pruning but after having decided which shrubs are to remain permanently, the remainder should be lifted out of the border and planted if desired in some other part of the garden. A well-ordered shrubbery to give the most satisfactory and pleasing results should be so arranged that every shrub is able to grow and demonstrate its full beauty of form and coloring without coming in contact with its neighbors. This applies particularly to conifers, for while a deciduous shrub, if damaged, is able to remedy an injury by forming new growth, a conifer is unable to reproduce its lateral boughs and will become unsightly if any of these are lost.

As I have previously said it is much better when forming a shrubbery to make one's own selection and I do not propose to enumerate any varieties but I would like to say a word about the use of shrubs with brightly colored foliage. On large estates where one has unlimited space it is possible to use golden, purple, or variegated leaved shrubs with good effects and I have seen them planted in beds by themselves when the results were pleasing, but they have to be used with great care and generally speaking, especially in small gardens, it is better not to use them at all. A combination of the many beautiful shades of green is in much better taste and more refreshing to the eye.

Discussion.

A lengthy and interesting discussion followed at the close of Mr. Thatcher's lecture. President Farquhar stated that the audience had hardly touched the amount of knowledge the lecturer had in store on this subject and suggested that questions be asked to bring out this knowledge.

The following are some of the principal points brought out during the discussion:

For winter protection of roses there was nothing better than covering with earth banked up around the base of the plants.

Some of the best hardy climbing roses are the Wichuraiana Hybrids, such as the Lady Gay, Dorothy Perkins, The Farquhar, Hiawatha, and Excelsa. The prairie rose (*Rosa setigera*) was also one of the best and does not need any covering.

For a shrub to grow under the shade of a hemlock tree he knew of nothing better than a Rhododendron or Kalmia. For shrubs best to use as a protection from northwest winds he recommended a mixture of evergreen and deciduous species. The native Viburnums were good in both foliage and fruit as well as other native American species which are not appreciated as much as their merits deserve. He especially mentioned *Viburnum cassinoides, V. acerifolium,* and *V. dentatum* which formed fine bushes 10 to 12 feet high and will do very well in dry soil.

In regard to moving and transplanting large trees the lecturer had seen so many failures that he did not see any advantage in it.

Evergreens can best be transplanted in April and a wet season was necessary. There was no great chance of success in taking up native specimens. It is better to get nursery grown stock for transplanting.

There are no finer shrubs than the Buddleias, the so-called summer lilacs. At Bar Harbor, Maine, they had lived through 25° below zero. The Cotoneaster was also worthy of attention on account of its foliage and fruit, especially the *Cotoneaster horizontalis,* which is almost an evergreen.

There are no shrubs more valuable than the lilacs.

In answer to a question as to some hardy vines the lecturer suggested *Vitis Coignetiae, Actinidia arguta,* Wistarias, Bignonia, and Clematis. The ornamental grapes are not very good as far as fruit is concerned.

In reply to a question why a fifteen-year-old Wistaria does not bloom he said that it was a habit of this vine sometimes. He advised root pruning in such a case. Dig a trench around the plant and cut off and shorten the roots.

The question was asked as to a book on the culture of shrubs.

President Farquhar replied to this question that there was no American book devoted to this subject. Such a book was one of the things most needed and it was unfortunate that we did not have such a publication written by a man of practical experience in this line.

Inquiry was made if *Rosa microphylla*, which grows in Maryland, could be grown here.

Mr. E. H. Wilson, in replying to this question, stated that while *Rosa microphylla* was a beautiful rose it was not hardy in Massachusetts. It is a native of Japan.

Mr. Wilson further stated that it was best for amateurs to start in with plants of known hardiness, and leave the experimenting with specialists. He said at least a half-dozen of the Cotoneasters were perfectly hardy, also an almost unlimited number of the barberries, although most of them were not better, perhaps, than *Berberis Thunbergii* and *B. vulgaris*.

One little group can be safely recommended he said for planting in gardens, two species of which will flower in January and February. One species, the *Hamamelis japonica*, will bloom sometimes in February and is more beautiful than the native species of witch hazel that flowers in the autumn. The other species, the *Hamamelis vernalis*, an American shrub, is perfectly hardy and flowers in the late winter when nothing else will be in bloom. He said he knew of nothing that would give greater pleasure and satisfaction than these two shrubs.

Mr. Robert Cameron said that not enough emphasis was laid upon the subject of pruning of shrubs. One of the questions most asked today is why their plants don't bloom. In most cases it is caused by bad and improper pruning at the wrong time. The pruning of shrubs he said is a difficult problem and it is better not to prune at all if one does not know what he is about. A great many shrubs need very little pruning and the principal thing is to preserve the natural habit and growth of the plants. He advised carefulness and not to let a man go around with pruning shears with no thought of the natural requirements of each species.

In answer to a question as to shrubs suitable for planting in a shady place Mr. Thatcher recommended Viburnums, *Ilex verticillata*, Clethra, and Rhododendrons, especially *R. Kaempferi*.

THE INSECT OUTLOOK FOR NEW ENGLAND.

By Dr. H. T. Fernald, Amherst, Mass.

Delivered before the Society, March 6, 1915.

More than twenty-five years ago it was my privilege to attend a lecture by one of the most eminent of the Professors of Biology in New England, in which he discussed the evolution and probable future of the human race. In the course of this lecture he described the ways in which man by his intelligence had gradually acquired his supremacy over the larger and fiercer animals and was converting the entire world and its supplies to his own use; how brain cells had conquered brute force; and how man had finally become the chief ruler of the earth. He warned his audience, however, of the danger of cultivating the intellect at the expense of the body of which it is the tenant, expressing the fear that if an undue development of mentality should occur without sufficient care for the development of the body, the time would come when man's supremacy would be at an end. Finally, he indicated one danger which might develop in the future, viz: the possibility that small forms of life having enormous powers of multiplication, might by consuming the food needed by man, lead to the starvation and ultimate extinction of the human race, leaving insects as the dominating animals on earth.

As time goes on, and the results of more careful research accumulate, the idea thus suggested a quarter of a century ago recurs with added force, and the present insect outlook, not only for New England but for North America and indeed for the whole world, becomes of increasing interest and importance. Will the human race some day disappear before the onslaughts of uncounted billions of insects which will consume our food? Has a new phase of the struggle for existence already begun? How is the battle going, and what may we anticipate in the years to come? These are questions worthy of some consideration at the present time.

How to find the answers or at least the presumptive answers to

such questions as these is of itself a problem. Prophecy is not available; mathematical calculation of the future increase of insects is out of the question, as too many unknown factors are involved; and only a study of the insect problem of the past, the factors which acting during this time have produced our present conditions, and the probable result of the continued influence of these and any new ones which may develop, on future conditions, seem to promise any aid in deciding what is really the insect outlook for the years to come.

The entomological conditions existing in this country when it was first settled, and as late as the middle of the eighteenth century, may perhaps be fairly termed aboriginal. Probably nine-tenths of the entire territory was unsettled and covered only by its native plants, shrubs, and trees, and these were attacked only by native insects. Under such conditions as these, undisturbed for centuries, Nature's methods for the preservation of plant and animal life would be present in their most unmodified form, and working without being influenced in any way by introduced and abnormal factors.

Given such conditions as just outlined, we find the existence of a principle which may be expressed as a paraphrase of the familiar principle in Physics that "Nature abhors a vacuum," in the form, "Nature abhors extermination." Apparently every plant and animal in a region has such relations to the others that its complete extermination upsets, to some degree, a very delicate balance of forces, leading to marked modifications at least, and perhaps to quite extensive readjustments of the life of that region. Nature's machinery, therefore, for preserving this balance is worthy of some attention.

It is at least theoretically possible that an insect having a given food plant might, without some check, increase to such numbers that practically all its food would be consumed, which would be followed by a nearly complete extermination of the insect by starvation. This would seem to be one of the possibilities Nature strives to avoid, as such an event would come perilously close to upsetting the balance she appears to be so desirous to preserve.

To prevent such a disaster as this might prove, we find that an undue increase of every form of life is controlled either by un-

avoidable climatic conditions or by the development of enemies, which increasing with the increase of their food, tend to restore equilibrium.

Several methods for accomplishing this seem to exist. The unusual abundance of any form may enable some disease ordinarily of minor importance to become a dominating force and reduce the form it attacks to its former standing. Parasites may be utilized in this way also, as may predaceous foes; or all three working together may accomplish the desired result, and restore an equilibrium which was on the point of being seriously disturbed.

Of the action and efficiency of disease in the case of insects we know but little. Of parasites and their method of work we know more. Apparently there are two classes of these, which for lack of better names, may be designated as continuous and sporadic, and a few moments may advantageously be given to their more detailed consideration.

With some insect pests little variation in their abundance from year to year seems to occur. Cutworms, for example, do not usually seem to be much more abundant one season than another. One student of this subject has stated that probably 98 of every 100 cutworms are parasitized each year, only about two per cent escaping destruction by their enemies. The progeny of this two per cent, however, is sufficient to produce an average amount of loss to the crops and the parasites from the 98 per cent attacked are sufficient to discover about 98 per cent of the cutworms the following year, thus holding these at about an average, often over long periods. A relation like this would place such parasites as continuous.

In other cases we find that a pest is present at a given time in such small numbers as to be of no practical importance. Its scarcity renders its discovery so difficult by its parasites that most of the latter die without finding food, and there is little check at this time upon the rapid increase of the pest. Each succeeding year, therefore, the pest increases in numbers as does also the parasite, but the latter appears to progress at first the less rapidly of the two. In this way a year finally arrives in which the pest has become so abundant as to cause serious loss. That year the parasites have no longer any trouble in finding all the individuals they require for the

production of their own maximum number in the next generation, and the usual result is, that though the parasites have failed to prevent the crop loss of that season, they kill most of the pests before they become adult, only a few escaping to continue the species in that locality. This result reacts on the parasites so that the following season enormous numbers of them die for lack of food, and the process begins all over again. Parasitism working in this way has been termed sporadic, and in its effects is by far the most noticeable, though probably not more efficient in its results than continuous parasitism.

Such natural methods of control as these, then, were the ones in existence in this country in colonial days under the conditions already touched upon, and, accordingly, we would expect to find that crop losses large in amount, occurred only at intervals when pests temporarily escaping from their control by sporadic parasites were enabled to work for a time undisturbed. That this was really the case is shown by old records, some of which have been brought together by Flint in one of his reports as Secretary of the Massachusetts Board of Agriculture. In this paper we find numerous records of which the following are samples: "1646 and 1649 were caterpillar years." "In 1658 the caterpillars did great harm to fruit trees." "In 1743 there were millions of devouring worms in armies;" and in 1749 "the grasshoppers appeared in myriads, eating up whole acres of potatoes."

How far these attacks were favored by unusual weather conditions as well as by the failure of parasites to check the insects cannot now be determined; but in any case we find that serious losses were only occasional though usually large when they did come.

With these as the normal conditions under practically a state of nature — such as I have already termed aboriginal — we must now consider the results upon the insect problem of the introduction upon the scene of that disturbing factor, Man, who by cultivating the soil and introducing new crops, always to some extent upsets Nature's equilibrium.

One of the changes caused by civilization is always an increase in the area occupied by certain plants. A corn field, for example, contains as many plants of corn as would normally be found in a

square mile at least, if the corn grew wild. Even a small apple orchard has more trees than would be found in a thousand times that area, originating naturally, and in the early days at least, we should remember that every apple tree was planted by man where it grew, wild trees being of more recent origin.

When extensive areas of single kinds of crops appeared then, a new factor was introduced into the situation. Food, concentrated and abundant, replaced food scattered and frequently scanty, as available for insect consumption, and the insects which already fed on that food or could successfully change to it would have every opportunity for rapid increase. Serious attacks under such conditions would be more frequent, the old relation between pest and sporadic parasite though holding good, being modified as regards frequency of repetition. Thus insect pests, as the settlement of the country increased, gradually became a factor of larger importance from the standpoint of loss.

But this was by no means all. Practically all of our larger fruits and many of our other crop plants are not natives of this country but were brought here by the early settlers from their former homes. Even in the early days when crossing the ocean meant weeks or even months in some cases, certain insects were able to survive the journey and establish themselves here. While no records are available on the subject it is probable that our now widely spread oyster-shell scale or bark louse reached this country on some small apple tree or cion brought over by an immigrant, and in a new country, with a climate perhaps more favorable than the one from which it was brought, and free from the attacks of its parasites, it began its spread over the United States. It is said that the Hessian fly was brought over in straw in the ships which conveyed the Hessian contingent of the British army here during the Revolutionary war. If so, it has certainly taken kindly to the new conditions and has now established a reputation as one of the worst half-dozen pests with which we have to deal.

The aboriginal situation we see, has now changed, insect outbreaks becoming more frequent; crops introduced being attacked by those insects already present, which were able to feed upon this new food; and by the introduction of other pests from foreign lands, where escaping from the attacks of their enemies at

home, they find every opportunity to multiply and cause serious destruction.

During the greater part of the nineteenth century the changes in the insect situation from the conditions just outlined were probably due less to the appearance of new factors than to the farther development of those already outlined. The spread of civilization westward enormously extended the areas devoted to cultivated crops of various kinds and furnished corresponding opportunities for enormous increases in the abundance of insects and for destruction. New pests from foreign countries from time to time succeeded in reaching this country and obtaining a foothold here, in nearly every case successfully escaping from their enemies in the process, and native forms, restricted in habitat, found in the coming of the settler new opportunities for progress.

The Colorado potato beetle is a well-known example of this. During an early exploring expedition through our then unknown western territory a beetle was found feeding on a wild species of Solanum. Specimens of this insect brought back by the expedition were found to be unknown to science and were described in 1824 by Professor Thomas Say, then practically the only working entomologist in this country, as *Doryphora decemlineata*, and for years this was its only name as it remained a little known and wholly unimportant insect. In time, however, when civilization and the potato reached the territory it inhabited, it seems to have found in this other species of Solanum not only a suitable food plant but also one far more abundant than its previous one. Adapting itself to these conditions, and with a practically unlimited supply of food, its spread and increase began and the insect soon became a true pest over the greater part of the United States.

Of how many other of our native insects a similar history is true, we may never know. The apple maggot or railroad worm probably fed on the fruit of our various kinds of thorn before the introduction of the apple, and many other such cases have undoubtedly occurred.

During the last quarter of the nineteenth century, new factors began to appear and influenced the situation. Transportation, increasing both in amount and in rapidity, came to the front and began to make it possible for more insects to safely reach this country from other lands. New lines established, increased the

list of countries from which insects might be imported, and a greater range in the materials brought in also increased the chances of destructive pests reaching our shores.

Shipboard surroundings can hardly be considered conducive to successful insect immigration. If an insect leaves Europe, for example, in one stage of its existence, and enters upon a long voyage, it is probable at least, that before its arrival its life in that stage will have terminated and that it will transform into the next succeeding one. In this it is not likely to find the proper conditions for the continuation of its life, and death will ensue. Each day the voyage is shortened, however, the greater the chance of arriving in the same stage in which it started, and then of finding the necessary conditions under which to maintain itself in its new form. If freshly cut logs containing the larvae of the leopard moth, for example, form the cargo of a sailing vessel which might be a long time in reaching its destination, it is probable that the changes in those logs due to cutting, drying, etc., would prevent the larvae from developing. If they were in the pupa stage it is likely that the moths would appear before the voyage was at an end and being without any places suitable to deposit their eggs, failure to reach this country would again result. If the voyage is so short, however, that when the cargo of logs was discharged the insects are still in the pupa stage, they would on emergence as adults, be liable to find a place at which they might successfully start a new generation.

The last quarter of the nineteenth century then was a period when, due to changes in our transportation facilities, insects began to have more chances of reaching this country alive than ever before, and our list of introduced pests began to increase rapidly.

During this period also, extensive agriculture largely developed, still more increasing the food supply of insects. Thousands of acres of one crop grown in single townships made it impossible for an insect feeding on that crop to fail to find all it needed. Three wheat fields of 17,000, 23,000, and 36,000 acres respectively, present at one time in a single valley in one of our western states; over 30,000 bushels of strawberries produced in a single Massachusetts town in one year; 6,500 acres of cotton on a single plantation: these are figures which perhaps express the possibilities of food

supply and consequent opportunity for the multiplication of insects, as effectively as can any method of presentation.

A third factor, also the result of extending for many years the area cultivated, which began to manifest itself about this time was the reduction in numbers of our insectivorous birds.

How large a factor these ever were is perhaps open to question, but everyone who has studied the subject concedes their extreme importance as insect destroyers. A few of them adjust themselves readily to man and live around houses; many, however, make their homes in thickets, woodland, and forest and are never content to live in other places. Extensive cultivation and the increasing demand for timber have combined to drive away such birds as these last to the less thickly settled and more densely wooded areas, and with their departure one of Nature's checks to the rapid increase of insects has largely disappeared.

During the last quarter of a century the great increase of wealth in this country has led to the appearance of many lines of industry formerly undeveloped. Large estates covered with rare and exotic plants have appeared; acres of farming land have become transformed into arboretums stocked with the plants of other countries; thousands of nurseries importing plants from all parts of the world have been established; tropical plants have been extensively grown under glass, and with rapid transportation available, the vegetable resources of the entire world have been drawn upon to bring beautiful, curious, or otherwise interesting plants into this country. Growing plants annually imported into Massachusetts alone, from foreign lands, represent a value of over two million dollars, and as most of these are brought in with more or less earth around their roots, and at the dormant season, both for the plants and for any insects which may be present upon them, the chance for new pests to reach and establish themselves in this country has become greater than ever before, and the importation of fruit from other countries affords another opportunity for the same thing to happen.

In order to protect ourselves as far as possible from an unchecked invasion of this country by foreign foes in these ways, the inspection of all imported nursery stock is now provided for in nearly every one of the states. For years after its desirability became evident,

this was impossible for lack of information as to the arrival and destination of the shipments. The presence of a large number of brown-tail nests on nursery stock received in different parts of this country in 1909 emphasized the fact, however, that unless imports were watched, the money spent in fighting this pest in New England to check its spread to other parts of the country would be wasted, and United States laws controlling nursery stock importations were established.

Under these laws the actual inspection of the stock is left to the authorities of the state to which it goes, but a system of reports is provided for by which the state inspector is enabled to keep track of each shipment and examine it. In this way the danger of the entrance of new pests into this country is reduced and the early discovery of any which temporarily escape observation, greatly increased.

Reports of the inspections made, show that many dangerous pests not now present in this country have been discovered in this way and destroyed, and that this work has been worth many times its cost. During the first season of import inspections more than half a dozen insects were discovered, any one of which, so far as could be judged, might have developed into a serious pest had it become established. Had such a system of inspection been in existence when the brown-tail moth was imported, the discovery and destruction of only that one nest would have saved hundreds of thousands of dollars in Massachusetts alone.

But while the inspection of imported stock is very valuable, its limitations should also be recognized. In many states funds for this purpose are either lacking or wholly inadequate, though a shipment to one of those states is just as liable to harbor a dangerous foe as one to a state able to properly inspect all shipments. The work is often prosecuted under unsatisfactory conditions. The stock cannot be left open long before planting, or it will dry out and die; it may be in a place where the light is poor, and something may be overlooked on that account; the shipments all come in practically during two months in the fall and two in the spring, concentrating the work in brief periods during which enormous quantities must be examined; and it is at times almost or quite impossible to obtain a sufficient number of properly trained men for such a short time.

An inspector of imported stock should not only have a thorough training in general entomology and plant diseases, but he should also know the pests and diseases of foreign countries in order to recognize them at sight, as otherwise some obscure case of infestation or infection not resembling anything present in this country might escape notice.

It would seem as though a knowledge of this kind might be obtained by a study of foreign publications, but strange as it may seem, there is little available from this source, economic entomology in foreign countries having received little attention until quite recently. As an illustration of this it may be stated that one of the most prominent of German entomologists recently remarked to the speaker that Germany suffered practically no loss by the attacks of insects, though a cursory examination an hour later of the trees and plants growing on his quarter of an acre house-lot revealed several trees dying and many of the other plants nearly worthless, from the attacks of insects!

With such conditions under which the inspector must work, and with at best an incomplete training for it, we must be prepared for the occasional appearance of some new insect or disease in this country.

The result of the action and interaction of the factors already considered, in this, the first quarter of the twentieth century is now ready for consideration. How does the insect problem stand today? What is the present situation?

To these questions we must answer that the situation is not entirely encouraging. We have materially upset the balance Nature strives to maintain, by our modern systems of extensive and intensive agriculture and by the reduction in number of our insectivorous birds, and we have unintentionally introduced many foreign pests which under new conditions have prospered far too well to satisfy us. On the other hand, we have developed artificial methods of control to an extent unparalleled elsewhere in the world; have studied life histories carefully in order to learn where treatment can be most effectively applied; have attempted to increase the effectiveness of parasites and diseases; yet in spite of all these efforts our annual losses by insects are greater than ever before! Must we acknowledge that our efforts have been failures; that our enemies are winning the battle? If this be so, what of the future?

The speaker has been called an "incorrigible entomological pessimist" and what has just been stated might seem to support this polysyllabic designation. Let me beg, however, that you suspend judgment for a little time, for there is "another side to the shield."

If we consider first the factors likely to cause continued or increased loss in the future, we find them to be several. Our agricultural methods in years to come are liable to continue along their present lines, and the acreage of crops of any one kind will probably increase rather than diminish. The insect enemies of those crops will thrive, and following them, so will their parasites, and it is probable that the intervals between the outbreaks will become somewhat shorter, because of the abundance of food, and each outbreak means a loss before it can be stopped. Insects not now important may change their food from something of little or no economic value to some of our crops and become serious pests. The introduced forms will spread more widely over the United States and exact a larger loss than at present; and at least some of our insectivorous birds will become almost extinct, thus practically eliminating them from further consideration. Whether those which can live in proximity to man will so increase in abundance as to make up for this, cannot now be determined, but it is perhaps doubtful if this will ever be the case. New pests from other parts of the world will establish themselves in those parts of this country where climate and food permit their existence, and the distribution of pests will ultimately be world-wide, limited only by the conditions of climate and food supply just named.

On the other hand, factors opposing this result have already begun to become active. Centuries give time for Nature to work in, while the conditions now existing are after all of relatively recent origin. During the last ten years parasites, heretofore unknown, have appeared, attacking the asparagus beetle, San José scale, chinch bug and several others of our serious insect foes. The pioneer work in economic entomology is now being followed by a most thorough study of all phases of the subject and already some promising lines for control have been revealed. The discovery of parasitic and other enemies which at least reduce the importance of our imported pests in their native habitats and the introduction

into this country of these has already resulted successfully in several cases, even though this line of control is in its infancy. The discovery and introduction into Massachusetts of parasites of the gypsy and brown-tail moths is of course, of particular importance to us in this connection, because of its local interest; but is also important because it is the most extensive experiment of the kind ever attempted. Such attempts as this have their dangers, however.

To state the case in its simplest terms we desire a parasite which will destroy the particular pest with which we are at the time concerned. If we find an insect belonging to a group of parasites escaping from some stage of the pest it might seem offhand as though it would be a parasite. This is not necessarily true, however. The pest may have been parasitized but the insect escaping may have been a parasite of the parasite rather than of the pest, and therefore injurious rather than beneficial. Again some parasites at times attack the pest, i. e., are primary parasites; while at others they may attack other primary parasites instead of the pest, thus becoming secondary parasites in their nature.

From these facts it is evident that the successful introduction of parasites into a country is far from the simple matter it might seem. A careful and exhaustive study of the interrelations of the forms concerned must be completed or the risk of introducing forms more injurious than beneficial will be incurred. In fact, this has actually occurred in one or two instances, and work along lines such as this should only be carried on by the most expert investigators carefully trained for the purpose. When properly conducted, however, this is one of the most promising ways in which man may be aided in his struggle against insects.

Our present knowledge of insecticides is far from complete. New materials are constantly being studied and some promise greater efficiency than those in general use. Extended research in this line is now being carried on and is much to be desired, and the results will surely aid us in our warfare against our tiny foes.

The possibility of producing by plant breeding, varieties resistant to insect attack is a field of which we are as yet absolutely ignorant. Whether it will ever be possible to produce plants of this nature is not known, but there is at least a hope that in this

way also, man may attain a more advantageous position and reduce losses by insects. The cultivation and spread of insect diseases is still another line calling for further research. That thus far little success has attended efforts to accomplish this is not necessarily an indication that nothing can be accomplished, but rather, that perhaps we have not been attacking the problem in the right way.

Much of our loss at the present time is due to ignorance, indifference, and neglect on the part of those who can least afford losses by insects. When a general understanding of the problems of insect control shall have been reached, so that the work of an intelligent farmer in protecting his crops from insects is no longer nullified by the failure of his neighbors to similarly care for theirs, either from neglect, ignorance, or the adoption of a "laissez faire" policy, the real success of artificial methods of control will become more evident and the results more commensurate with the efforts put forth.

How far these different lines of investigation may prove successful in the war against insects, no one can tell. New principles of attack, different methods, and above all a more general understanding of conditions and realization of the necessity for concerted coöperation will undoubtedly accomplish much. But behind all this, the infinite power of Nature working slowly, quietly, and persistently, to gradually restore the equilibrium partly overthrown by man in this rapidly growing country of ours should never be forgotten. The battle may turn in favor of our pigmy foes for the moment, but Nature herself is infinitely greater than her children, and the final outcome cannot be better expressed than in the favorite saying of the entomologist and stone cutter of Reading, Pa., "Time at last sets all things even."

Discussion.

The question was asked as to the success attending the introduction of the parasites of the gypsy moth.

In reply Dr. Fernald said that he would rather underestimate the effects of the parasites than overestimate them. They have not been here long enough to show fully what they can do and we need

several more generations before we can tell their value. The gypsy moth has been with us since 1869 while the parasites have had only three or four years' test. We can only judge of their usefulness by observing conditions in those regions in which they have been longer established. He had visited some of these places and found results decidedly encouraging, some 40 to 50 per cent of the caterpillars having been destroyed.

No parasite can be expected to exterminate the gypsy moth. It is contrary to nature's method. They will do their work up to a certain extent but we cannot expect them to exterminate the pest wholly.

Wm. N. Craig inquired as to what the State had been doing in the matter of the use of disease cultures for the gypsy moth pest and if it were not possible to do more in this line. Mr. Craig said that he had tried this method on forty acres of woodland with great success. It was planted at small cost and the trees were as clear as if sprayed. He thought there was a future for this wilt disease in his opinion.

In regard to this wilt disease Dr. Fernald said that it was excellent in theory and worked out in practice to a certain extent, but the results thus far had been small and all efforts had been on the whole rather discouraging so far.

A great deal depends on favorable climatic conditions which are important factors when the wilt is planted. If conditions are not favorable the disease will not spread, especially in a dry season, and if a wet season the disease was already there.

The subject of the poisoning of birds as a result of the use of insecticides was brought up.

Dr. Fernald replied that this was a disputed point and the evidence so far was rather conflicting. In his opinion the small amount of poison contained in a fine misty spray as used on garden plants was not dangerous to bird life. In tree spraying where a large amount of poison spray is used there may be more danger and there was a strong suspicion that some birds are killed by it.

Charles Bigelow inquired as to the status of the San José scale in Massachusetts and if it was increasing.

Dr. Fernald answered that it cannot very well avoid increasing. It was gradually becoming more general and spreading under

suitable climatic conditions. It will not spread much further northward. It must be met as a perpetual pest. The U. S. Government imported a species of lady bug to exterminate it but it was not successful.

George N. Smith called attention to the aphis pest on fruit trees concerning which the Lecturer remarked that its power of reproduction was tremendous. It was, however, sensitive to cold and wet, and in such conditions was less troublesome, but in a warm or dry season it would thrive and multiply.

The trees should be sprayed as soon as the insects appear. Spray with "Black Leaf 40" or some other tobacco mixture. This is more effective than kerosene emulsion or soap spray.

DISEASES OF THE PEONY.

By Prof. H. H. Whetzel, Ithaca, N. Y.

Delivered before the Society, March 27, 1915.

The John Lewis Russell Lecture.

It is an old fable passed down from catalog to catalog that "The peony is free from diseases." Yet one has only to observe carefully for one season the peony plants in gardens, lawns, and nurseries to lose his childish faith in the story. Not less than seven distinct diseases of this beautiful perennial are now commonly to be met with in eastern United States. Doubtless there are others not yet recognized or reported. I now have these seven slated for further study and observation and expect to add others to my list this season. The less we know of the diseases of a plant the fewer and less important they appear. The reverse is equally true. Yet it is only through greater familiarity and more knowledge of them that we may hope to save our plants from their ravages.

The first step in our study of the diseases of the peony is to learn to recognize them, to distinguish them, the one from the others, to name them. This we may accomplish only by learning the characteristic symptoms of each. This will be my chief object in the present paper. The next step is to discover the cause of each different malady, to uncover the nature of the pathogen, be it fungus, bacterium, or what not, that is chiefly responsible for the diseased condition. In this direction but little progress has as yet been made. This is largely the problem of the plant doctors, and I hope to be able to have shortly many more facts on this phase of the subject than we now possess.

Of the control of these different diseases least is naturally known, and only with fuller knowledge of the pathogens and their life habits will we be able to intelligently undertake experiments on control. What I may have to offer on this part of the subject must of necessity be only suggestions.

Diseases of the Root.

The Root Gall. The root gall disease appears to be rather widely distributed in eastern United States and is well known to the growers who make a specialty of this plant. Specimens have come to my hands from time to time during the last eight years. No special investigations on this disease appear to have been made, and aside from a short article in the Florists Exchange of April 19, 1909, it appears to have been rarely written about. Whether it was first imported from Europe or is of American origin is not known. Certain imported French varieties are often very severely affected. It is regarded by peony specialists as a troublesome and by some as a dangerous malady.

Symptoms. The above-ground symptoms are many weak, spindling shoots which remain short and give no blooms. The shoots often grow fewer and shorter from season to season, the plants gradually dying out. In other cases the plants appear to gradually recover, the shoots growing stronger from year to year and finally blooming. The latter appears to be the case when the roots are frequently divided and reset. The affected roots are short, stubby, and irregularly knotted or swollen. The crown on which the bud sets is often much swollen. The fine rootlets are often covered with galls. The lower ends of the galled roots seem to rot away.

Cause. The nematode worm, *Heterodera radicicola*, is probably responsible for some galls on peony roots. Bessey [1] reports it as very injurious to the roots of the peony. This microscopic worm affects the roots of no less than 480 different species of plants. It is most common and destructive in the South, but is frequent on greenhouse plants in northern United States and on the roots of certain perennials, like ginseng and peony, easily survives the winter outside.

Control. Until a fuller investigation of the disease has been made, suggestions as to control cannot be very definite. In general it will probably be most profitable to dig up and destroy all diseased

[1] Bessey, E. A. Root Knot and its control. U. S. Agr. Dept. Bur. Pl. Ind. Bul. 217 : 18, 43.

plants. The experience of some growers indicates that with rare or expensive varieties it may be profitable to help the plant "outgrow" the trouble by frequently dividing and transplanting the roots. Where nematodes are the cause of the swellings, diseased roots should never be planted on land along with the healthy or on which it is expected to grow peonies continuously. Land on which galled plants have been grown should not be used again for peonies for three or four years. The worms will usually die out, especially here in the North, for want of a suitable host in which to survive.

Root Rots. Rotting roots of normal size and shape have several times been sent to me by growers. What appears to have been a similar root rot has been reported by the botanists of the Connecticut and Massachusetts Experiment Stations. Some growers have reported it as very destructive.

Symptoms. The rotting away of the crown and the larger roots seem to be a rather constant symptom. The top of the plants either fail to appear in the spring or wilt and die during the summer.

Cause. The cause of root rot is apparently unknown. Nothing more than a casual examination appears to have been made by those plant pathologists who have reported on the disease. It is very probable that we have under the name of root rot several different diseases. They are very likely due to fungi or bacteria, though winter injury may sometimes be responsible.

Control. Removal and destruction of diseased roots and the planting of peonies on other land are the only suggestions to be made with our present knowledge of root rots.

Diseases of the Stem, Leaves, and Flowers.

The Mosaic Disease. So far as I am aware this is the first record of this very peculiar and interesting malady of the peony leaf. I have observed this disease now for several seasons in the peony plantation at Cornell University. It has doubtless been observed by others and is probably of wide distribution. It does not appear to be a serious malady.

Symptoms. The symptoms are very striking. Usually only one or two stalks in a cluster are affected. The leaves show rings

of concentric bands of alternating dark and light green color. The spots are sometimes large, with broad bands; in other cases small with narrow bands, the spots densely crowded over the leaf. I have observed no evidences of dwarfing or injury other than the peculiar markings above described.

Cause. So far as I am aware no investigation of the cause of this disease has been undertaken. It looks much like the well-known mosaic disease of tobacco and other plants, the cause of which has long been sought but never certainly discovered. The mosaic disease of tobacco is known to be very infectious. Whether this of the peony is also capable of being transmitted from diseased to healthy plants, I have not determined as yet.

Control. Nothing with respect to control can be suggested except destruction of diseased plants, until we know more of the nature and cause of the trouble.

The Anthracnose. This is a name I am giving to a disease affecting the stems and leaves of the peony. So far as I can find this has never been recorded before, at least in this country. It appears, from my observations in the Cornell University peony plantation, to be a rather dangerous malady and deserving of the attention of peony growers and plant pathologists.

Symptoms. The disease shows first in the early summer as dark reddish bordered spots with almost white centers. Later the centers become a bit sunken and show minute black pimples under the dead epidermis, presumably the beginnings of the fungous fruit bodies. During the latter part of the summer the spotting of the stems becomes very severe and the leaves are often severely affected with what appears to be the same disease.

Cause. This anthracnose is quite certainly a fungous disease, but up to the present I have not been able to discover mature fruit bodies of a fungus in the lesions and have not had the time to undertake a careful investigation of the malady.

Control. Probably sanitary measures, involving removal and burning of diseased tops early in the autumn would be effective in getting rid of the pathogen which probably winters in the diseased stems and leaves.

The Leaf Blotch. This disease appears to be one of the best and longest known diseases of peonies. It was first described from

Europe where it is to be observed in almost every peony planting today. It is also very common in America. It does not appear to be a serious disease as it affects only the leaves and does not appear until the latter part of the season after the leaves have apparently begun to mature for autumn.

Symptoms. The symptoms are distinct and striking, large purple blotches on the upper surface, often an inch to two or three inches in diameter. The tissue does not become dead and dry as in the case of the Botrytis blight spots to be described later. The blotch on the underside of the leaf is a peculiar dull brown, as though the epidermis of the leaf had been scorched. In moist weather the center of the spot below becomes covered with an olive green felt, the stalks and spores of the pathogen.

Cause. The disease is doubtless due to a fungus which goes by the name of *Cladosporium paeoniae.*

Control. Where this disease gives trouble, early removal and destruction of all diseased tops will doubtless be found most satisfactory in preventing its appearance another season. The fungus most probably passes the winter in the diseased and fallen leaves from which in the spring a new crop of spores find their way to the next crop of leaves.

The Sclerotinia Stem Rot. This disease is probably more common than is suspected, but because its symptoms are so like those of the Botrytis disease has probably seldom been recognized. I have had diseased specimens from but one grower some years ago, but recent inoculation experiments which I have made with the pathogens show it capable of rapid destruction of young peony shoots.

Symptoms. A sudden wilting of young or even nearly mature stalks, due to a rotting off at the base near the ground, is the first evidence of this disease. At this stage it cannot usually be distinguished from the more common Botrytis disease which affects the plants in the same way. Later the dead stalks on being split open will often show large black bodies, sclerotia, in the pith. These are never present in stalks killed by Botrytis.

Cause. The disease is caused by a fungus, *Sclerotinia libertiana,* which is a most omnipresent parasite amongst cultivated plants, especially greenhouse and garden plants. It is not particular as

to the host plants it attacks, so it is not surprising that the peony, too, sometimes falls a victim to it. Wet weather greatly favors its destructiveness.

Control. Prompt removal and destruction of wilting stalks, cutting close to the crown and the removal of the soil all about the crown is important. The fungous threads spread from stalk to stalk through the soil. Removed soil should be replaced with fresh clean soil, preferably sand. Keep manure away from the crowns. The sclerotia carry the fungus through the winter and therefore the burning of all diseased stalks is desirable.

The Botrytis Blight. This is by far the most common and destructive disease of the peony so far as known at present. This disease is frequently epidemic, especially during wet springs. It occurs wherever peonies are grown, apparently the world over. It is well known in Europe, especially in Holland and England. Much in the way of scattered notes and records of its occurrence have appeared in florists' papers and experiment station reports for the past twenty years. I published a short article on the symptoms and destructiveness of this disease in the Florists' Exchange, September 14, 1912.

Symptoms. The disease affects stems, buds, and leaves, appearing on these organs in the spring and summer in the order given. The first appearance of the malady is almost always early in the spring as the stalks are coming up. Shoots 4 to 8 inches tall, their leaves not yet expanded, will suddenly wilt and fall over. Examination shows them to be rotted at the base at or below the surface of the soil. The lesions begin usually at the base of the first leaf sheath and spread down to the crown and up often an inch or more above ground. The rotted portion soon becomes covered with a felty brown coat of spores and spore stalks of the fungus, thus distinguishing it from the similar stem rot caused by Sclerotinia. While it is generally the young stems that are affected, I have seen stalks with blossoms opening, suddenly wilt and fall over from Botrytis stem rot at the base.

The buds are the next to show injury from this disease. Sometimes the very small young buds are attacked, turn black and dry up. This is often spoken of as bud blast. Larger buds are later affected, turn brown and fail to open; the stalk for several inches

below the bud is usually killed, turns brown and frequently shows alternating stripes or bands of dark and light brown color. When broken open, such buds present a dark brown rotten mass. This is the "bud rot" stage of the disease. In a wet season as high as 80 or 90 per cent of the buds may thus be rotted before they can open. Opened flowers are also often affected, becoming discolored and rotten. The rotted buds and flowers soon become covered with the brown felt of the spore stalks and spores of the pathogen.

The leaves are usually the last to show symptoms of this disease, in the form of large irregular spots which spread rapidly usually from the apex or sinuses of the leaves. The tissue is killed, becoming brown and dry so that it crumples readily. The underside of the spot is soon covered with the spore stalks of the fungus. The blighting of the leaves gives the plants a most untidy appearance. The leaf blight form is very common on peony plants everywhere during the latter part of the summer, becoming very bad during rainy weather. In dry seasons the disease is but little in evidence.

Cause. The cause of this disease has long been attributed to the fungus, Botrytis, found constantly associated with the lesions on stem, bud, and leaf. There are many described species of Botrytis, some of which are very common on greenhouse and garden crops. The Botrytis forms found on peony have been referred usually to *Botrytis vulgaris* or *Botrytis cinerea*, and *Botrytis paeoniae*, the last described by a Hollander as the cause of the disease in that country. My own studies indicate that there are at least two distinct species of Botrytis attacking and causing identical symptoms in the peonies both in this country and in Europe. The species while quite distinct in structure are very similar in their life habits and effects on the peony. One forms large sclerotia (resting bodies), while the other forms very minute ones. I have never seen the sclerotia of the large form except in my cultures, but the small ones are commonly formed in the diseased stalks just beneath the epidermis and appear as black pimples the size of a pin head. Presumably they serve to carry the fungus through the winter on the old stubble left by cutting away the tops. There in the spring they probably give rise to a new crop of spores, in just the best position to infect the new shoots when they come up. I have not yet determined whether these pathogens ever attack crowns and roots or not.

Control. The control of this disease is very difficult for several reasons. It is destructive only in wet seasons. One of the pathogens, the small sclerotial form, is very common and widely distributed. The other, the large sclerotial form, having a number of different hosts, may readily pass from one of them to the peony if it be near by. Spores are produced in great quantities and carried both by wind and insects. Ants seem to carry the spores from the base of diseased stalks to the buds of healthy plants. Here in the exuded sugary solution, so abundant upon unopened peony buds, the spores find both food and moisture and germinate much more promptly and vigorously than in water. The peony is very susceptible, there being apparently little difference in susceptibility of the different varieties. Spraying is in the first place undesirable as it discolors foliage and buds, and in the second place our experiments indicate that the sugary exudate of the buds effectively neutralizes the copper in Bordeaux so that the spores germinate and infect sprayed buds just as readily as unsprayed. Sulpur in its various forms appears to be equally ineffective in preventing the bud rot form of the malady.

Eradication measures offer the most promise of success in the control of the Botrytis blight. To be effective, however, they must begin with the careful removal of the old stubs in the autumn or very early in the spring and be prosecuted persistently throughout the season. To remove the old stubble carefully, remove the soil from the crown, so as not to injure the buds. Cut away the old stalks close to the crown and burn. These old stalks harbor the fungus. Replace the soil removed with fresh clean soil, preferably sand, or at least top coat with sand. When the shoots begin to appear, inspect them daily and remove by cutting close to the crown any that show wilting. These should be burned. By promptly removing these wilting shoots, you prevent the crop of spores that always appears if the dead shoots are left and so greatly reduce the chance of infection of buds and leaves.

The daily inspection must now include the young growing buds and any that begin to turn brown or black and die must be removed and destroyed. As the buds grow older and approach the blooming time, the infection will usually be first evident at the base of the bud on one side as a brown lesion, which will gradually spread up,

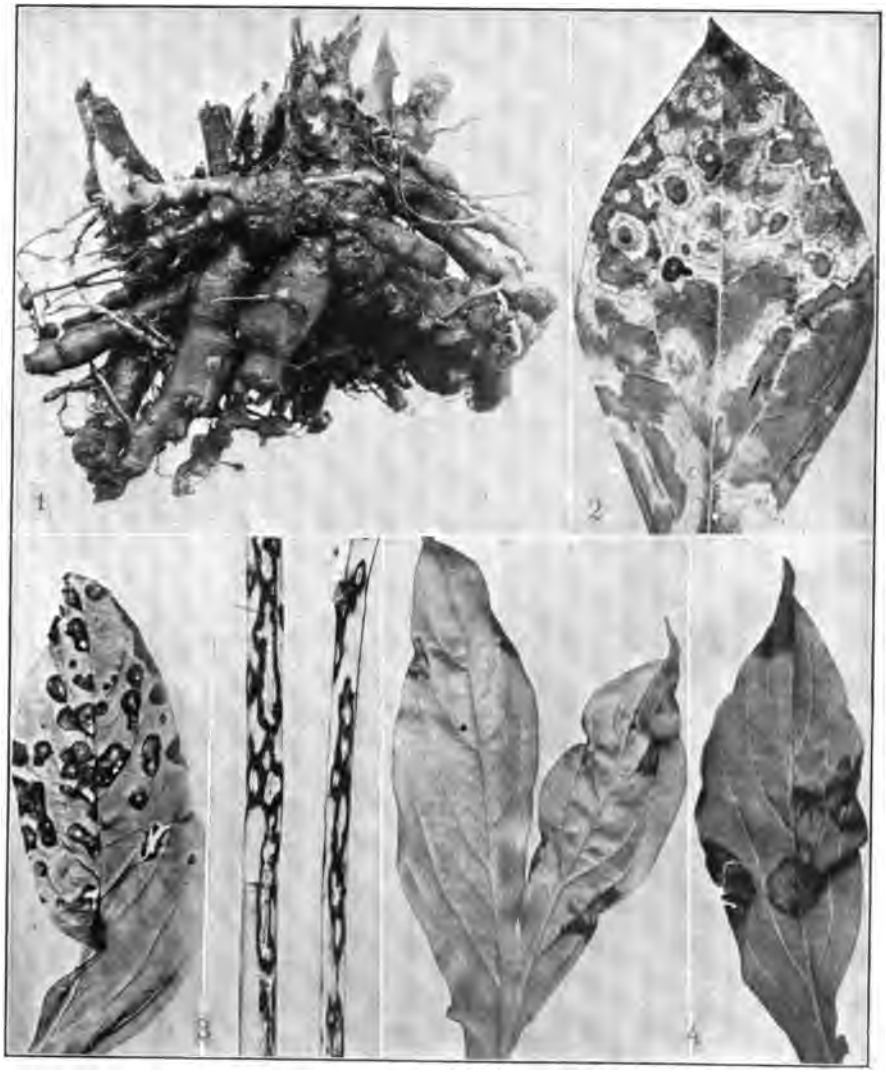
involving the entire bud, turning it brown. Spreading downward it gradually involves the entire circumference of the stem. It will be very important to detect these lesions in the early stages and remove the diseased buds, for spores are produced most abundantly on rotted buds and are also in the most favorable position for distribution by wind and insects to healthy buds. Spotted leaves should also be promptly picked off. However if the early spring inspection and eradication operations have been thorough and there are no diseased peonies near by, the foliage will probably suffer but little. In wet seasons these inspections should be made daily. In dry weather less often will suffice. For the nurserymen or the grower of large numbers of peonies, this method of control may not be profitable, but for the small grower or in the private garden where a relatively small number of clusters are planted, it will be found entirely practicable and profitable. Even in a large area I believe the eradication measures I have outlined are worthy a thorough trial.

Conclusions. The ultimate end and object of all plant disease investigations is control. It must be evident from what has preceded that our knowledge of the diseases of the peony is limited indeed, that most of it is yet to be discovered. Naturally then our suggestions as to control cannot be specific. They must be general and they cannot be taken as positive recommendations, only suggestions based on limited knowledge as to the most likely lines along which success is to be expected. Spraying cannot of course get at the root troubles and our past experience and the ornamental character of the plant both discourage this as a means of protecting the parts of the plant above ground. Sanitary measures involving the prompt eradication of the diseased parts, as I have already suggested for the most of the diseases described, offer the most practicable and satisfactory methods for the control of the various maladies to which this beautiful ornamental is subject.

EXPLANATION OF PLATES.

Plate 1, Fig. 1. Peony root long affected with root gall. The main roots are short and stubby. The small feeding roots are covered with young galls. Fig. 2. Leaf showing the mosaic disease mottlings. Fig. 3. Leaves and stems badly affected with the anthracnose. Fig. 4. The leaf blotch lesions as they appear on both upper and lower surface of the leaf, purple above, dull brown below.

Plate 2, Fig. 1. Shoots wilting over from attack of the Botrytis at the base. Fig. 2. Two Botrytis rotted buds and one healthy one from the same plant. Fig. 3. Young bud blighted, the pathogen extending into and attacking the stem. Fig. 4. Botrytis blighted leaves. Note the powdery spore masses on the leaf showing the lower surface. Fig. 5. An old diseased stalk covered with minute sclerotia of the Botrytis.



WHETZEL — DISEASES OF THE PEONY

WHETZEL — DISEASES OF THE PEONY

634.06
M4
H8t

ACCESSIONS DEPT.
RECEIVED
MAY 22 1916

UNIV. OF MICH.
LIBRARY

TRANSACTIONS

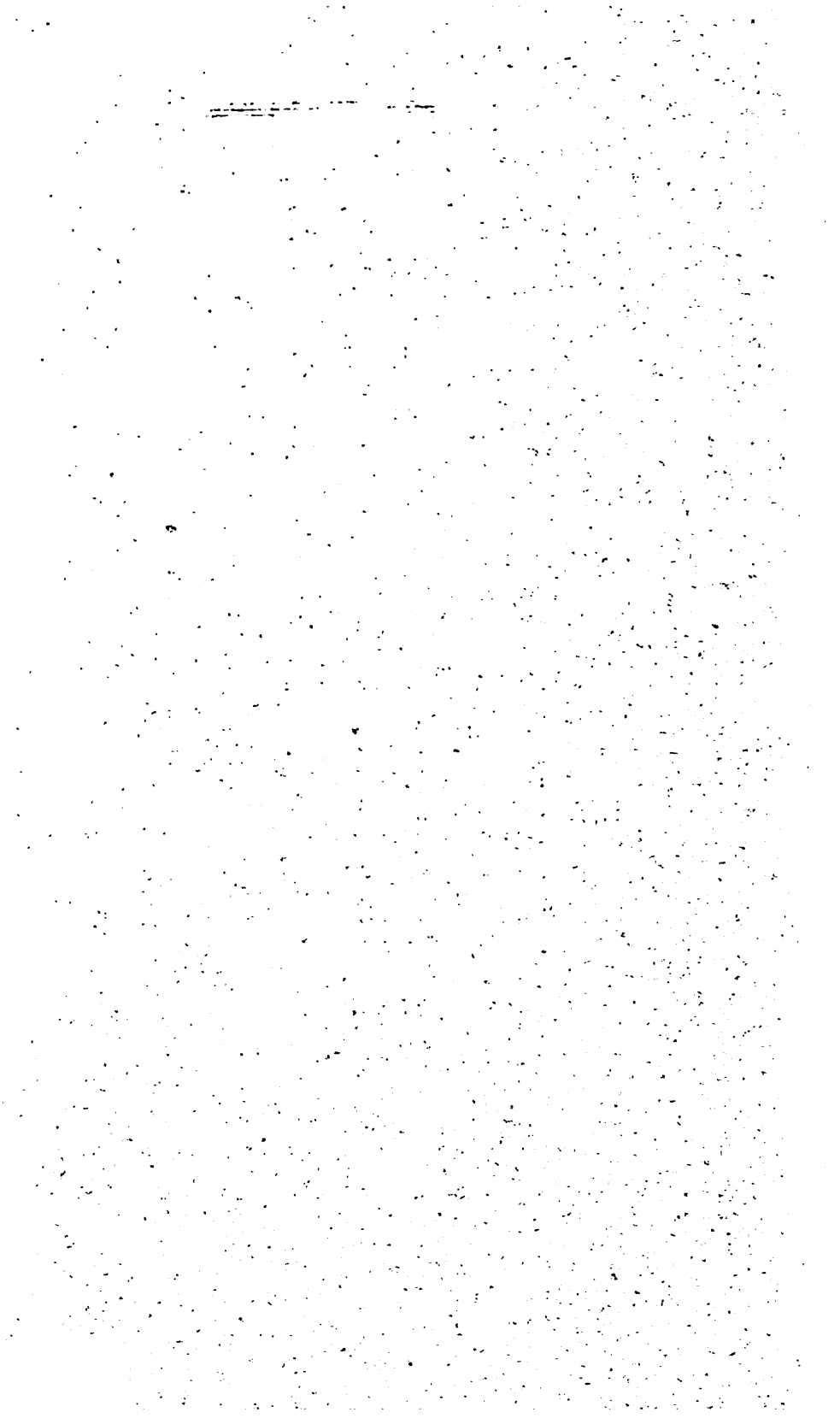
OF THE

MASSACHUSETTS HORTICULTURAL SOCIETY

FOR THE YEAR 1915

PART II

PUBLISHED BY THE SOCIETY
BOSTON
NINETEEN HUNDRED AND SIXTEEN



634.079
M4
H8t

TRANSACTIONS

OF THE

Massachusetts Horticultural Society

FOR THE YEAR 1915

PART II

BOSTON
PRINTED FOR THE SOCIETY
NINETEEN HUNDRED AND SIXTEEN

MASSACHUSETTS HORTICULTURAL SOCIETY.

1915.

The Transactions of the Society are issued annually in two parts under the direction of the Committee on Lectures and Publications.

Communications relating to the objects of the Society, its publications, exhibitions, and membership, may be addressed to William P. Rich, Secretary, Horticultural Hall, No. 300 Massachusetts Avenue, Boston, Massachusetts.

WILFRID WHEELER, *Chairman* GEORGE B. DORR PROF. F. C. SEARS FRED A. WILSON	*Committee on Lectures and Publications*

CONTENTS

ANNUAL REPORTS FOR THE YEAR 1915

Report of the Board of Trustees 119

Report of the Committee on Prizes and Exhibitions . 129

Report of the Committee on Plants and Flowers . . 131

Report of the Committee on Fruits 175

Report of the Committee on Vegetables 193

Report of the Committee on Gardens 209

Report of the Committee on Children's Gardens . . 213

Report of the Committee on Lectures and Publications 217

Report of the Delegate to the State Board of Agriculture 219

Report of the Secretary and Librarian 227

Report of the Treasurer 229

THE ANNUAL MEETING, NOVEMBER 13, 1915 . . . 237

NECROLOGY, 1915 241

OFFICERS, COMMITTEES, AND MEMBERS, 1915 . . . 247

ANNUAL REPORTS FOR THE YEAR 1915.

THE DUTCH GARDEN, MARCH, 1915

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

1915, PART II.

REPORT OF THE BOARD OF TRUSTEES FOR THE YEAR 1915.

The Board of Trustees of the Massachusetts Horticultural Society has held eight meetings during the year 1915 and a summary of the business transacted is presented herewith to the members of the Society.

January 2. The following communication from Sir Harry J. Veitch of London was presented and ordered to be entered upon the records of the Board:

34, Redcliffe Gardens,
South Kensington, S. W.
Oct. 21, 1914.

William P. Rich, Esq.
Massachusetts Horticultural Society,
Boston.

Dear Sir,

I am favoured with your letter of the 6th inst. informing me that the Board of Trustees of your Society have conferred upon me the great honour of the George Robert White Medal of Honour for 1914.

I beg you to assure your Board that I appreciate most highly this great and unexpected recognition of any services I may have rendered to Horticulture with which I have been actively connected for nearly sixty years. It will afford me the greatest possible gratification to receive this mark of their esteem. I am, Dear Sir,

Yours very faithfully,
Harry J. Veitch.

Walter Hunnewell was appointed Treasurer of the Society, William P. Rich was appointed Secretary, Librarian, and Superintendent of the Building, and James Wheeler was appointed Superintendent of Exhibitions for the year 1915.

An appropriation of $400.00, in addition to the income of the French and Farlow Funds, was voted for the library, and $300.00 for expenses and awards was voted for the Committee on Gardens for the ensuing year.

It was voted to extend the courtesies of the Society to the Massachusetts State Board of Agriculture and the use of the halls, free of expense, was granted to the Board for its winter meeting in Boston in December next.

The vote of the Board of Trustees passed at its meeting April 4, 1914, in regard to the receipts for life membership fees, was taken up and discussed. It was voted to refer the matter to the Treasurer with a recommendation that the entire amount of receipts for life membership fees be transferred to the permanent funds of the Society provided that it could be done without making too large a deficit for the present year.

The following vote of the Society adopted at its Annual Meeting, November 14, 1914, was taken up for consideration:

MOTION OFFERED BY MR. C. H. W. FOSTER.

Whereas it is some fourteen or fifteen years since the building of this Society was constructed, and

Whereas the needs of the Society and possibility of income from the rental of its hall have changed,

Now, therefore, be it moved;

That it is the sense of this meeting that the Trustees consider the advisability of reconstructing the interior of the building of the Society, so that it will be better adapted to the purposes of the Society and will bring about an increase in its income, and that the Trustees be requested to make a report upon this subject at a special meeting of the Society to be called not later than May 1st, 1915.

It was voted that a committee of three be appointed by the President and Vice President Saltonstall, of which committee Mr. Saltonstall shall be a member, to consider the vote of the Society and report at a special meeting of the Board to be held

prior to May 1; and it was further voted than an appropriation not exceeding $500.00 be made for expert advice in the matter.

January 15. President Farquhar stated that the meeting had been called to consider the advisability of some changes in the methods of carrying on the work of the Society. He said that the present policy was not advancing horticulture, that the lines of activity were very restricted, and that there was need of broadening out the work of the Society if it is to maintain an advanced position in horticulture.

He suggested a reduction in the number of exhibitions and making them on a larger scale so as to attract the interest of horticulturists from without the state. We were spending, he said, $7000.00 annually which in his opinion was not returning to the Society the value of this expenditure. He also suggested that moving pictures might be made useful in teaching methods of horticulture such as the pruning of trees, etc., and that the Schedules of Exhibitions should be prepared two years in advance.

That the Trustees may have opportunity to study these suggestions he advocated the appointment of a special committee to be called the Committee on Horticultural Progress.

It was voted that the President appoint such a committee to consist of five members, three of whom should be members of the Board, the others from the membership of the Society, and to report back to the Board.

Mr. Hunnewell called attention to the vote of the Trustees in regard to the transfer of the receipts for life membership fees to the permanent funds of the Society, stating that this action had caused a deficit in the year's financial statement of approximately $2500.00.

February 19. The following memorial was read by the Secretary and adopted:

In Memoriam.

Charles Wallingford Parker.

Since the last meeting of the Board of Trustees of the Massachusetts Horticultural Society our associate member, Charles Wallingford Parker, has been called to the higher life.

For sixty-three years he was engaged in business in this city and he has left a record of honorable dealing that has made his name and that of his firm an example of the highest ideals of commercial life. In the midst of an active business career he found time for the cultivation of interest in the finer things of life and he was especially devoted to the objects for which this Society was established. His love for horticultural pursuits was strong and on his Marblehead acres he developed from the ruggedest environment an estate that is considered by horticulturists a model for the treatment of such places on our rocky coast.

From the year 1898 until the time of his death he was actively interested in the executive management of the Society, as Chairman of committees and as Vice President in 1909 and 1910 and as President during the years 1911 and 1912.

In appreciation of his services to this Society and to horticulture generally and as an expression of the high esteem in which his memory is held by his associates it is therefore voted that this memorial be entered upon the records of the Board and a copy sent to his family in testimony of our heartfelt sympathy in their bereavement.

Professor Sargent spoke on the subject of the proposed Committee on Horticultural Progress. He said that this committee should all be members of the Board and that its duties should be of an advisory rather than of an executive character.

After a general discussion of the subject Mr. Saltonstall offered the following motion and moved that it be substituted for the motion adopted at the meeting of January 15.

Voted: — That, pursuant to the provision of Clause (5) of Section IX. of the By-Laws, the Board of Trustees shall appoint a committee to be known as the Executive Committee, to be composed of the President of the Society, *ex officio*, and four members of the Board of Trustees. The Secretary of the Society shall act as Secretary of the Executive Committee.

That the Executive Committee shall have the general power to advise and assist the Board of Trustees, to examine and report to the Trustees on all appropriations, to consider and suggest names of members of committees to be appointed by the Trustees, to keep itself informed of the work of the committees appointed by the Trustees, and to make from time to time to the Trustees suggestions for the improvement of the Society and the extension of its work for the development of horticulture, it being understood that no power is hereby given to the Executive Committee which in any

way conflicts or interferes with the rights and powers of the Trustees under the By-Laws.

The motion of Mr. Saltonstall was unanimously adopted and the President appointed as this committee Messrs. Sargent, Saltonstall, Allen, and Roland.

The committee appointed at the last meeting of the Board in reference to the vote of the Society passed at its Annual Meeting in November last reported informally through its Chairman, Mr. Saltonstall. He said that this committee had held several meetings and had consulted with architects and real estate men in regard to the proposed remodelling of the Society's building. The committee, however, was not ready at present to make any definite recommendations in the matter.

April 3. A communication from Sir Harry J. Veitch was read, acknowledging with much appreciation the receipt of the George Robert White Medal of Honor recently forwarded to him.

It was voted to substitute the term Advisory Committee in place of Executive Committee as voted at the meeting of February 19.

William C. Endicott of Danvers was elected a Trustee for the remainder of the year to fill the vacancy in the Board occasioned by the death of Charles W. Parker.

An appropriation of $6000.00, in addition to the income of the special prize funds of the Society, was voted for prizes and gratuities for the year 1916.

Professor Sargent, Chairman of the Committee on Library, sent a communication in regard to the publication of a catalogue of the library which has been in preparation during the last two years. He estimated the cost of the printing and binding at about $3000.00. It was voted that the sum of $1500.00 be appropriated from the funds of the Society, provided that an additional amount of $1500.00 be secured by the Library Committee from other sources.

President Farquhar called attention to the proposed field meetings of the Society to be held during the present year, and suggested a series of visits to the Arnold Arboretum with a competent instructor in charge.

It was voted to refer the matter to the Committee on Gardens

with authority to carry the proposed plan into effect, and an appropriation of $200.00 was voted for this purpose.

An appropriation not exceeding $500.00, to include the income of the John Lewis Russell Fund, was voted for the lecture course of the year 1916.

July 26. The following recommendation from the Committee on Prizes and Exhibitions was presented:

At a meeting of the Committee on Prizes and Exhibitions held June 30, 1915, the following vote was adopted:

> The Committee on Prizes and Exhibitions desires to express to the Board of Trustees that in the opinion of the members of this committee it is inadvisable to hold fortnightly exhibitions during the year 1916 as recommended by the Advisory Committee.

Mr. Wheeler moved an amendment to the report of the Advisory Committee in the matter of the exhibitions for the year 1916, substituting monthly exhibitions in place of fortnightly exhibitions. The amendment was not adopted.

Mr. Saltonstall stated that the doings of the Advisory Committee should be approved by the full Board of Trustees. He said that the action of this committee in the matter of the exhibitions for the year 1916 intended to emphasize the monthly shows and that the other exhibitions of the month should be of a less important character.

The records of the several meetings of the Advisory Committee, up to and including that of July 21, were read by the Secretary, on request, and it was voted that the doings of the Advisory Committee in the interim of the Board meetings be approved.

Another recommendation from the Committee on Prizes and Exhibitions was presented as follows:

> At a meeting of the Committee on Prizes and Exhibitions held June 16, 1915, it was voted to recommend to the Board of Trustees that the unexpended balance of the appropriation for prizes and gratuities for the year 1915 be added to the appropriation for 1916 to be used for the two large exhibitions of that year.

It was voted that this recommendation of the Committee on Prizes and Exhibitions be referred to the Advisory Committee to confer with the Committee on Prizes and Exhibitions.

August 12. The Advisory Committee submitted its report on the Schedule of Prizes and Exhibitions for the year 1916, approving the arrangement as presented by the Committee on Prizes and Exhibitions with the exception of the third prizes in the fruit list and the increase of the first and second prizes for fruits. The Advisory Committee recommended the elimination of the third prize in the Schedule and that the first and second prizes for fruits be the same as in the Schedule for 1915.

It was voted to accept and approve the Schedule of Prizes and Exhibitions for the year 1916 as recommended by the Advisory Committee.

The President stated that the Schedule of the Society should be prepared two or three years in advance and recommended an amendment to Article 4, Section IX of the By-Laws in order that such a change could be carried into effect. It was voted that the matter of the proposed amendment be referred to Mr. Saltonstall with authority to prepare such an amendment to be approved by the Board and submitted to the Society at the annual meeting in November.

A communication from Mr. Charles F. Fairbanks was presented offering to the Society a gift of $135.00 to be devoted to prizes at the exhibitions of the year 1916. It was voted to accept the offer of Mr. Fairbanks with thanks for his interest in the matter and to refer it to the Committee on Prizes and Exhibitions.

The special committee consisting of Messrs. Saltonstall, Allen, and Farquhar, appointed January 2, 1915, to consider the subject of remodelling the Society's Building, presented a written report stating that it is not expedient at the present time to undertake such alteration. It was voted that the report of this special committee be accepted and placed on file.

Mr. Allen referred to the desirability of changing the color of the brick walls of the large exhibition hall of the Society's Building and the matter was referred to the Finance Committee to report at the next meeting of the Board.

The thanks of the Trustees were extended to Mr. Kidder for his gift of a dozen handsome chairs for the Trustees' room.

October 2. Mr. Saltonstall, to whom was referred at the previous meeting the preparation of amendments to the By-Laws of the

Society permitting appropriations for prizes and gratuities to be made two or three years in advance, reported the following amendments:

1. That the second paragraph of Section II of the By-Laws be amended so as to provide that the Trustees may appropriate a sum or sums amounting to more than $5000 for the purpose of prizes and gratuities, provided that there shall not be appropriated for the purpose of being expended in any one year, in addition to the income of special prize funds of the Society, a sum or sums exceeding the amount of the general income of the Society for the preceding year applicable for such purpose as shown by the report of the Treasurer, so that the said second paragraph of Section II as so amended shall read as follows:

> The Trustees or any five of them, or any fifteen members of the Society, may propose business to be considered at any special meeting, of which proposed business notice shall be given as provided in Section I. No sale of the Society's real estate, and no expenditure or contract therefor, amounting to more than $5000 for any one purpose, shall, except as provided in the next paragraph of this section, be valid and binding on the Society unless authorized by vote of the Society.
>
> The Trustees may appropriate a sum or sums amounting to more than $5000 for the purpose of prizes and gratuities, provided that there shall not be appropriated for the purpose of being expended in any one year, in addition to the income of the special prize funds of the Society, a sum or sums exceeding the amount of the general income of the Society for the preceding year applicable for such purpose as shown by the report of the Treasurer.

2. That Clause 4 of Section IX of the By-Laws of the Society be and the same hereby is amended so as to provide that appropriations for prizes and gratuities may be made by the Trustees not more than three years in advance so that said Clause 4 of Section IX as so amended shall read as follows:

> SECTION IX. (4) They shall consider and pass upon all questions of the appropriation of money including the amounts to be appropriated for prizes and gratuities. Appropriations for prizes and gratuities may be made by them not more than three years in advance and they shall, at the annual meeting, report to the Society the amounts they have so appropriated for prizes and gratuities and also such other appropriations as they think meet for the ensuing year. They may, however, subject to the provisions of Section II, make such additional appropriations for the purposes of the Society as they deem proper.

3. That Clause 7 of Section IX of the By-Laws of the Society be and the same hereby is amended so as to provide that exhibitions of flowers,

plants, fruits and vegetables may be arranged for by the Trustees not more than three years in advance, and shall be announced at the annual meeting of the Society, so that said Clause 7 of Section IX as so amended shall read as follows:

> SECTION IX. (7) They shall arrange for six or more exhibitions of flowers, plants, fruits and vegetables each year, and shall have the entire charge of all arrangements for conducting the same. Such exhibitions may be arranged for by them not more than three years in advance and shall be announced each year at the annual meeting of the Society.

It was voted to approve the proposed amendments and to submit them for the action of the Society at the Annual Meeting, November 13.

An appropriation of $350.00 was voted for prizes for children's gardens for the year 1916.

The President appointed Messrs. Kidder, Dane, Wilder, and Roland a special committee to report at the next meeting a list of nominations for the standing committees of the Society for the ensuing year.

December 4. The committee on additional special prizes for the Society's exhibitions in the year 1916 reported through Mr. Saltonstall that practically the amount of subscriptions desired had been secured. It was voted that the matter of these special prizes be referred to the Committee on Prizes and Exhibitions in conjunction with the special committee.

The special committee on the award of the George Robert White Medal of Honor for the year 1915 reported the name of Ernest Henry Wilson. The committee stated that Mr. Wilson was worthy of this award for no one in recent years had done more for the advancement of horticulture than he, for he had introduced to cultivation a greater number of desirable garden plants than had ever before been accomplished by any one man.

On motion of Mr. Saltonstall, seconded by Professor Sargent, it was voted with acclamation to award the George Robert White Medal of Honor for the year 1915 to Ernest Henry Wilson.

The committee of the Board appointed to present a list of the various standing committees of the Society for the ensuing year reported through its Chairman, Mr. Kidder, the following nominations:

THE ROSE GARDEN OF MISS SARAH B. FAY AT WOODS HOLE, MASS.

REPORT OF THE COMMITTEE ON PLANTS AND FLOWERS FOR THE YEAR 1915.

By T. D. Hatfield, Chairman.

The exhibitions of the year 1915 were above the average and the spring and autumn shows were especially noteworthy.

Winter Exhibitions.

Carnations were the feature of the Midwinter Show held on February 6. The prize winners were J. A. Nelson of Framingham, A. A. Pembroke of Beverly, S. J. Goddard of Framingham, and Strouts of Biddeford, Maine.

Pink Delight is well established as the best pink Carnation. Beacon is still at the front among red varieties. Mrs. C. W. Ward is the best rose-pink variety, and Benora the best variegated. Gorgeous of salmon-pink tints was exceedingly well shown by A. A. Pembroke, but as yet has not established itself in popular favor. Matchless, White Wonder, and White Perfection compete for favor among whites. A. Roper of Tewksbury showed his new light pink variety, Miss Alice Coombs, in excellent condition and was awarded a Silver Medal.

Mrs. Frederick Ayer showed a fine specimen plant of *Acacia heterophylla* and Miss Cornelia Warren had a good general display of spring-flowering plants, including Heaths, Cytisus, Cyclamen, and Primulas. W. W. Edgar Co. put up a neat display of commercial plants, including Palms, Ferns, Cytisus, *Acacia Drummondii*, Azaleas, and Tulips.

Mrs. J. L. Gardner's group of Orchids included some very fine *Calanthe Veitchii* and Duncan Finlayson's specimen *Dendrobium Wardianum* was extra well grown and flowered.

On February 27 some unusual Orchids were shown by E. B.

Dane. A Silver Medal was awarded him for *Sophro-Cattleya Thwaitesii* (*Sophronitis grandiflora* × *Cattleya Mendelii*) which may be described as a diminutive Cattleya, enriched with the vivid tints of the Sophronitis.

A First Class Certificate also was awarded him for the bi-generic Orchid *Odontioda Charlesworthii* (*Odontoglossum Harryanum* × *Cochlioda Noetzliana*). The characteristics of both parents were plainly evident in this hybrid.

A Certificate of Honorable Mention was awarded E. B. Dane for a hybrid Cattleya (*Cattleya Schroderae* × *Cattleya Thayeriana*), color a lavender self.

Spring Exhibition.

The Spring Show of March 18–21, 1915, was the best we have had for years. All the halls were filled to the limit, even the vestibule, and crowded besides. There was no room for chairs. Those of us who are interested enough to be close observers have noticed the large number of elderly people who visit our shows, so that this convenience was very much missed. Gratifying as it was that the attendance was good it was nevertheless made clear that if we are to have shows good enough to draw a large patronage to make the Society the success we aim at we shall need more room.

The Farquhars' Dutch Garden was the drawing card. By this is meant it was what brought the people. There were many other excellent exhibits and the quality of the material was of a high order throughout.

Much as your committee disapproves of the present fashion in table decoration there is no denying the fact that it is a great attraction. While on the matter of table decorations it may be as well to say what we have in mind now. With probably one exception all the tables at this exhibition were overloaded. It should never be forgotten that tables are primarily for carrying food and the function of dining. Flowers are secondary. Most of the decorators appeared to be obsessed with the idea that they were for flowers only.

Notwithstanding that the International Flower Show was in progress in New York, the National Rose Society did itself full

credit. A wonderful lot of Roses was staged. The Killarney type eclipsed all others in pink and white shades. Joseph Heacock of Wyncote, Pa., A. N. Pierson of Cromwell, Ct., S. J. Reuter of Westerly, R. I., Waban Rose Conservatories of Natick, and Montgomery Co. of Hadley were the principal exhibitors.

A. N. Pierson showed a magnificent vase of Mrs. Aaron Ward, a glorious yellow Rose. Mr. Heacock's Lady Hillingdon was another yellow Rose of high quality. J. Welsh Young of New York showed My Maryland, an unequaled shell pink. Reuter's Mrs. Taft, a tinted cream, was very much admired. Prince d'Arenberg from A. N. Pierson is a beautiful velvety crimson. There was also the coppery Sunburst from Reuter; Radiance from Heacock, that delightful pink; Mrs. Charles Russell and its deeply colored sport, Mrs. Bayard Thayer, from the Waban Rose Conservatories; and the Hadley from Montgomery of Hadley, Mass. This last, the Hadley, is probably the finest crimson Rose in existence. Combined with its fine form and good lasting qualities it has a most delightful fragrance.

Roses in pots in fine form were shown by Thomas Roland of Nahant whose collection embraced all the best decorative varieties as well as many of the best climbing types. The decorative value of the climbers exceeds that of any other class of Roses.

Other exhibitors in this class were the W. W. Edgar Co., whose collection, though smaller, was equally good in the quality of the material, and Mr. Palmer of Brookline, who put up an excellent group, including some fine standards of the climbing Tausendschon, all set up in excellent taste.

M. H. Walsh of Woods Hole sent a large collection of specimen Rambler Roses which included all the best this noted raiser has produced. They were large trained specimens and entirely filled one end of the hall. It comes pretty near being the last time we shall see such a large collection of well-grown plants of this class from him. The White Gold Medal of Honor, only awarded to those who have excelled in special branches of horticulture has recently been given to Mr. Walsh, and the American Rose Society's Silver Medal to this display.

William Sim of Cliftondale showed a wonderful lot of winter-flowering Sweet Peas. He has done this so often that we have

come to expect it, but we did not expect Sweet Peas with flower stems nearly two feet long, carrying four flowers each, as a regular thing. A Silver Medal was awarded Mr. Sim for his group and the following named varieties were given First Class Certificates of Merit: Orchid Beauty, cerise; Rose Queen, medium pink; Anita Wehrmann, lavender; Venus, white; and Mrs. Skaach, pink.

Walter Hunnewell made a large display of specimen *Erica melanthera.*

The Silver Medal for the best Orchid display went to Mrs. C. G. Weld. The material was excellent and the display was well set up. In the group were good plants of *Dendrobium Wardianum,* Cypripediums, Coelogynes, Oncidiums, Cattleyas, and Odontoglossums.

F. J. Dolansky won the Bronze Medal with exceptionally well-grown *Cattleya Trianae, C. Schroderae, C. gigas,* and *C. speciosissima* in his group.

The Faulkner Farm, Wm. N. Craig, gardener, sent an excellent collection of Orchids, mainly Dendrobiums and Odontoglossums, all very fine types. E. B. Dane's collection of Orchids was extra choice, including Miltonias, Phalaenopsis, Laelio-Cattleya Gen. French (*Laelia cinnabarina* × *Cattleya Trianae*), fine forms of *Oncidium varicosum Rogersii, Dendrobium Wardianum, Phalaenopsis Reimstadtiana, Renanthera Imschootiana,* and *Odontoglossum Hysterin.*

Mrs. Frederick Ayer's Acacias were a most attractive feature and were placed where they showed to good advantage. The group included *Acacia heterophylla, A. Drummondii, A. cordata, A. armata, A. Riceana, A. pulchella,* and *A. verticillata.*

Cyclamens are a standing feature of our Spring Shows and have been uniformly good for many years. Competition is always keen. Honors were divided between Mrs. Lester Leland, E. A. Clark, and Mrs. J. L. Gardner. The W. W. Edgar Co. made a pretty display of new French Hydrangeas which proved quite a feature.

Detail in Farquhars' Dutch Garden was well carried out. The canvas and windmill were necessary to carry out the illusion perfectly. As a picture it was unique. The basic features were Bay trees, Cedars, Laurels, flowering Cherries, Laburnums, Cytisus, and Forsythias, filled in with *Azalea Kaempferi,* Ghent

and Mollis Azaleas, Rhododendrons, Lilacs, Spiraeas, Box bushes, Roses, Primroses, Wallflowers, Lily of the Valley, and a general collection of spring-flowering bulbous plants.

A fountain in the center, margined with pink Spiraea, *Asparagus Sprengeri*, Callas, and dwarf Wistaria, made a pretty color effect.

In front was a flower bed, in which the floral combination was Schizanthus and *Primula malacoides*, blue and white. A small house with red-tiled roof and sabots for the feet of the attendants completed the picture.

Mr. Roland staged a group of commercial sized hardwooded plants, including *Acacia Drummondii*, Chorizemas, Camellias, Boronias, *Erica Cavendishii*, *E. Wilmoriana*, E. King Edward, *E. codonodes*, *E. melanthera*, *E. persoluta*, and *E. cupressina*.

Carnations were shown by Edw. Winkler of Wakefield, M. A. Patten, John Nelson, Roper, and others. Winkler's Morning Glow, shown for the first time, made a good impression. It is near to the old Grace Wilder in color, soft light pink, a shade that is very much in demand. Other varieties were, Beacon, Benora, Pink Delight, and Philadelphia.

The first prize for the best decorative group went to the Weld Garden, composed of flowering and foliage plants, and most effectively arranged. Palms and Ferns made the background, with flowering plants as a filling, including Primulas, Schizanthus, Cyclamen, Orchids, Imantophyllums, Rhododendrons, Cytisus, Antirrhinums, Wallflowers, and White Broom.

In the W. W. Edgar group were several good things. The features were bold and well distributed. A bright red Bottle Brush, *Callistemon lanceolatus*, usually known as *Metrosideros floribunda*, was a stranger to most of the visitors. It is a native of Australasia, and is interesting as representing an ancient flora, now peculiar to that part of the world. Hydrangeas, Lilacs, Lilies, Azaleas, Rhododendrons, and Cytisus, made up the rest of a very showy group.

The Faulkner Farm, W. N. Craig, gardener, made a display of foliage and flowering plants which for even good quality was unexcelled, and included Heaths, Marguerites, Rhododendron Pink Pearl, Broom, and Cytisus. Mr. Craig had also a group of Cinerarias, representing the various types, which was interesting

as showing the various forms and steps taken to bring the Cineraria to its present degree of perfection. Sim's Pansies made a hit, a beautiful lot in exquisite colors.

D. R. Craig of Wellesley set up a pretty lot of flowering and berried plants. Conspicuous among them were fine specimens of *Ardisia crenulata* and *Abutilon megapotamicum*.

Jackson Dawson was awarded a First Class Certificate of Merit for a hybrid Azalea (*A. Kaempferi* × *A. Amoena*), quite intermediate in form, with the color of *A. Kaempferi*.

Mrs. Luther Adams Breck made a large and very interesting display of Darwin Tulips. The first prize for the general bulbous display went to Mrs. C. G. Weld with one of the best exhibits in point of numbers, variety, and general make up, we have had for years. Other bulbous plants were quite up to the average and competition close.

May Exhibition.

The May Show, May 15 and 16, did not seem to "hit it right" as to the proper date for Tulips and Narcissi, so that only part of the Schedule was in competition. Pelargoniums and Pansies were up to the mark. Herbaceous Calceolarias came from E. A. Clark and the hybrid Stewartii from Mrs. C. G. Weld. Late-flowering Tulips came from the Faulkner Farm and Narcissi from Wm. Whitman.

Miscellaneous exhibits were yellow Marguerites from James Wheeler of Natick and Hydrangea Radiance, a fine pink, from Mrs. J. L. Gardner. A Silver Medal was awarded to F. J. Dolansky for excellence in variety of *Cattleya Mossiae*.

Miss Ruth G. Taylor of Westfield made a very interesting exhibit of native plants including Asarum, Dentaria, Polygala, Hepatica, Sanguinaria, *Trillium erythrocarpum*, and *T. erectum*. Wild flowers were displayed also by Lester D. Watson of Dorchester including Viburnum, Gold Thread, Trillium, Lamium, Anemonella, Saxifraga, Uvularia, Polygonatum, and Potentilla.

On May 29, the committee was surprised with an exhibit of hybrid Irises from Miss Grace Sturtevant of Wellesley Farms. They were crosses between *Iris squalens, aurea-reticulata, florentina,*

sambucina, pallida, Cengialti, orientalis-sanguinea, and *pseudacorus.* Many of these and their hybrids and forms have been loosely gathered under the collective name of German Iris. From their parentage, at least in part, some of them are liable to the latter designation; others not being hybrids pure and simple.

The list of varieties today of what are known as German Iris is a large one; but when we come to make a careful selection, say of a dozen of the best and most distinctive, we find we have about all there is in variety. There evidently has been little scientific hybridization, without which we cannot look for definite results, in the creation of new forms and varieties.

Miss Sturtevant's process of hybridizing has been carried out scientifically and the records carefully kept. Some of the crosses were so wide apart that results of value could hardly be expected, nevertheless, results, in some cases most astonishing, occurred.

Ten varieties received the Society's First Class Certificate of Merit; six on the 29th of May and four on the 5th of June. There were 22 in all exhibited, and we doubt if any of them could be duplicated in commerce.

Miss Sturtevant's descriptions and records of the crosses of the varieties certificated, together with a brief outline of her work in her own words, is given herewith.

Description of Twelve Hybrid German Irises, Exhibited May 29, 1915.

By Grace Sturtevant, Wellesley Farms, Mass.

1. PAL-AUREA. First Class Certificate.

A very good example of a first generation hybrid blending noticeably the characteristics of the parents, in height (30″), growth and color giving a smoky-violet with a rich, glowing yellow effect through the center. The pallida shaped bloom of good size and substance is rich and somber.

2. PRESTIGE (IGNITITIA × STRIATA). First Class Certificate.

Standards bright clear yellow, upright and ruffled. Falls the same color but white towards the center where it is widely veined with light brown; horizontal with ruffled ends; 18″.

3. ELINOR (QUEEN OF MAY × ROSE UNIQUE). FIRST CLASS CERTIFICATE.

Very light, clear pink bloom, white through center, with less lavender and yellow than either parent; 18″ high, erect with side blooms held close to the stem. Each blossom lasts three or four days.

4. MAGNATE (JACQUINIANA × CYPRIANA CATERINA). FIRST CLASS CERTIFICATE.

A large, heavy bloom with upright, fluted standards and velvety crimson falls which hang perpendicularly from the middle of the beard; the haft is light yellow veined with crimson. The blossom is held upright and close to the stem which is 27″ long.

5. QUEEN CATERINA (QUEEN OF MAY × CYPRIANA CATERINA). FIRST CLASS CERTIFICATE.

It has a three and a half foot flexuous stem with five or six blooms of very light lavender, except for the white haft veined with yellow-brown. It is the shape of Cypriana Caterina.

6. SARABAND (EDINA × IRIS KING). FIRST CLASS CERTIFICATE.

The shape of IRIS KING though more slender in growth. Light peach color throughout except the rich velvety crimson center of the fall. There is a quarter-inch light border, the extreme margin is dark, and there is a light line down the center.

THE ABOVE SIX WERE THOSE CHOSEN FOR THE FIRST CLASS CERTIFICATES OF MERIT.

7. DEMURE (JACQUINIANA × ROSE UNIQUE).

Standards a light transparent pinkish-brown; falls a deep rose on brown. The shape of ROSE UNIQUE. Height 27″.

8. TRUTH (ORIFLAMME × COUNT DE ST. CLAIR).

Clear white, style arms light pink, crest veined with blue. Stem 2′ with blossoms on short stalks near top. Exquisite and graceful.

9. ROSECRANS (ORIFLAMME × HECTOR).

A sturdy much branched, floriferous plant. Standards a light shade of old rose and so widely opened that the yellow style arms

show. Fall deep old rose, heavily veined darker, horizontal with the tip of the blade drooping. Size of Hector.

10. MERLIN (ORIFLAMME × IRIS KING).

Flower large and of good substance. Standards smoky lavender faintly veined with violet, fluted upright and open. Falls red-purple to beard, haft white veined purple, beard conspicuous, orange. Height 30″.

11. CORDON BLEU (SAMBUCINA × ISOLA).

Self-colored very dark blue purple. Stem slender, 2½ feet. Blossom short and broad, falls flare, beard white with orange tips.

12. GARNET (DR. BERNICE × QUEEN OF MAY).

A pink DR. BERNICE though smaller throughout. Standards, color of QUEEN OF MAY; Falls, dark velvety garnet. Height 27″.

A DESCRIPTION OF TEN HYBRID IRISES EXHIBITED BY GRACE STURTEVANT, WELLESLEY FARMS, MASS.; JUNE 5 & 6, 1915.

1. PRINCE CHARMING (ORIFLAMME × COUNT DE ST. CLAIR). FIRST CLASS CERTIFICATE.

A very refined and dainty white bloom, a short broad oval in outline. Standards and falls faintly fringed with blue. Style arms and crest violet-blue. The blooms are borne close to and near the top of the 2′ slender stem.

2. B. Y. MORRISON (EDINA × IRIS KING). FIRST CLASS CERTIFICATE.

Standards clear blue-lavender, 3″ long and 1¾″ broad. Falls, a solid, velvety purple blade bordered with a quarter inch band of blue-lavender, (the color of the standards). The extreme edge is dark, the falls flare and the veins next the beard are dark, red-purple, and heavy. Falls 3½″ long, 1¾″ wide.

3. AFTERGLOW (PALLIDA DALMATICA × AUREA). FIRST CLASS CERTIFICATE.

Light pink- or buff-gray shading to a soft rich yellow in the center, the shape of PAL. SPECIOSA. Stem branching 3′.

4. Q. C. (QUEEN OF MAY × CYPRIANA CATERINA). First Class Certificate.

Self colored delicate pink-lavender, large and of fine shape and substance. Shape of Cypriana. Falls flare, 5″ long, 2¼″ wide. Standards 4″ long, overlap at top. End of beard blush.

The Above Four Received First Class Certificates of Merit.

5. RAKAN (EDINA × IRIS KING).

Standards yellow, short, fluted, 2½″ long, 1¼″ wide. Falls, blade solid purple for ½″ breaking into heavy branching veins on a white ground 1″ in front of beard. Yellow border $\frac{3}{16}$″ wide. Falls 3″ long, 1½″ wide, horizontal.

6. BASHIBAZUK (SHELFORD CHIEFTAIN × CYPRIANA CATERINA).

Enormous flower; crowded blooms. Standards blue-lavender, 5″ long, 3″ wide, upright. Falls with a deeper blush of red-violet in center. They droop from the beard and are even in outline, 5″ long, 2½″ wide. Haft white, straight across at beard veined yellow-brown.

7. CONSTANCE (MADAME CHEREAU × IRIS KING).

In shape and growth similar to Iris King. Bright lavender, center of standards lighter, haft of falls veined on white.

8. CARIB (HONORABLE × HECTOR).

Shape and size of Hector 27″ high, stout and low branching. 10 or 11 blooms often to a stalk. Standards, light pink-buff. Falls similar with interlacing of crimson veins. Yellow style arms and orange beard give a charming effect.

9. RANGOON (ORIFLAMME × CELESTE).

Violet-purple. Falls a shade darker. Standards the shape and size of Oriflamme. 18″ high.

10. MUSQUETEER (CORDELIA × CYPRIANA CATERINA).

Haft heavily veined on white and orange beard conspicuous. Clear rich violet, of Cypriana type. Standards lighter. 3′ tall, upright. Two branches with close held blooms, 6 or 7 to stalk.

I had had for a number of years, quite a collection of named irises in my garden, but it was not until 1909 when my interest was aroused by the blooming of half a dozen chance seedlings that I began to hybridize them.

That first year I made a great many crosses but obtained only a few pods and those poorly filled with seed, the result of faulty procedure and from attempting to cross too divergent species.

I have however, obtained a cross with Sambucina × Orientalis sanguinea, another with Orientalis sanguinea × Cengialti, one with Cengialti and Hecata, and one from Pseudacorus with pollen from Mrs. G. Darwin. This last however, refuses to bloom. They are interesting botanically but are of poor growth. It may be of interest to note here that I have failed to obtain a single seed from any plant in the Germanica Section last summer, which was very favorable for seed production. I had three promising pods but they proved to be empty. W. R. Dykes says it is impossible to obtain seed in England but that in a warmer climate the result might be better.

I have kept careful records hoping to ascertain the laws governing the dominance of the most prominent garden characteristics, such as size, shape, color, and markings of the bloom, and the habit of growth, but thus far, judging from my seedlings, the only thing that can be counted on is the surprising variety. I can recognize in the seedling points derived from one or the other parent, but I should hesitate to predict even the color. Out of nearly one thousand plants I have had less than a dozen just like one of the parents.

June Exhibitions.

German Irises were the feature of the exhibition of June 5. Interest was again centered in Miss Sturtevant's unique display.

Standard varieties were shown by J. K. Alexander, East Bridgewater, E. M. Dunphe, Elmwood, G. N. Smith, Wellesley, T. C. Thurlow's Sons, West Newbury, and Mrs. Frederick Ayer of Newton Highlands.

Here follows a list of 22 varieties, being a selection of the best, from five displays, with a description of each and the number of times displayed:

Aurea	yellow		2
Gracchus	stands white	falls yellow, pencilled light brown	5
Johan De Witt	" blue	falls purple	1
Mrs. H. Darwin	" white	" pencilled violet-brown	3
King Edward	" light blue	" reddish crimson	1
Mme. Chereau	" white	" white, pencilled blue	4

Pallida varieties	stands	lavender	falls	lavender	5
Queen of May	"	rose-pink	"	rose-pink	5
Hector	"	yellow	"	reddish brown	1
St. Clair	"	pale blue	"	deep violet	1
Dr. Bernice	"	coppery bronze	"	velvety red	2
Mme. Newbounnes	"	deep golden	"	yellow self	2
Gypsy Queen	"	coppery red	"	reddish brown	1
Niebelungen	"	" "	"	" "	2
Lohengrin	"	blue	"	blue	2
Gertrude	"	white	"	tinted blue	1
Stanley	"	bronze	"	bronze	1
Americus	"	white	"	blue	1
Iris King	"	golden yellow	"	plum, edged yellow	2
Florentina	"	light blue	"	self color	1
Flavescens	"	straw yellow	"	" "	2
Kharput	"	royal purple	"	" "	1

Mrs. J. L. Gardner had a neat display of Orchids including *Cattleya gigas, C. Mossiae, Cypripedium barbatum, C. Lawrencianum, Miltonia vexillaria, Masdevallia Veitchiana, Calanthe veratrifolia, Vanda teres, Thunia Veitchii, Laelia cinnabarina, Phalaenopsis amabilis,* and *Dendrobium superbum.*

The Weld Garden made a tasty display of hardy flowers including 40 varieties. The names of the best are *Phlox divaricata, Baptisia australis, Iris florentina, Saponaria ocymoides, Anchusa italica, Aquilegia caerulea* hybrids, *Lupinus polyphyllus,* blue and white, *Geranium platypetalum, Dictamnus fraxinella alba,* Hybrid Pyrethrums, *Hemerocallis aurantiaca* × *major,* H. Gold Dust, *Papaver orientalis, Viola cornuta atropurpurea.*

Wm. Whitman and Miss Cornelia Warren made excellent displays of Canterbury Bells. Mrs. J. L. Gardner sent a very fine specimen of the unusual *Gloriosa Rothschildiana,* and nice Streptocarpus.

E. B. Dane showed a well-grown specimen of *Clerodendron Balfouri* and Mrs. E. M. Gill a neat display of cut flowers. Dolansky's display of *Cattleya gigas, C. Mossiae,* and small plants of *Miltonia vexillaria* was exceptionally well done. Walter Hunnewell made a large display of Rhododendrons.

The Peony Show was down to be held on the 12th of June. Peonies were late and as nothing else was listed it was hoped to put the show off until the 19th. However, as no decision could be

arrived at in time, the show had to be held according to schedule. There were only five entries competing in three classes, so the full schedule was repeated on the 19th.

The Eastern Nurseries had hardy flowers; Wm. Whitman, Irises; T. C. Thurlow's Sons, early Peonies; Wellesley Nurseries, Irises; and Walter Hunnewell, Peonies.

A First Class Certificate of Merit was awarded the Eastern Nurseries for a new Chinese Potentilla, flowers yellow, and a certificate of Honorable Mention to Jackson Dawson for a new hybrid Rhododendron, Hazel Dawson (*R. ledifolium* × *Kaempferi*).

The regular Peony Show was held on June 19th of even date with the Rose Show. It was held in conjunction with the National Peony Society. There was a large display including many notable varieties. Without going into details as to the most successful exhibitors, the best noted were:

White,— Baron Schroeder, Avalanche, Festiva Maxima, Grandiflora Nivea, Mme. de Verneville, Mont Blanc, Duchesse de Nemours, and Mme. Lemoine.

Pink,— Felix Crousse, Edulis Superba, Carmen, Indispensable, Mons. Boucharlat aîné, Walter Faxon, Venus, Marguerite Gérard, and Thérèse.

Red,— Mrs. Manning, M. Martin Cahuzac, Edouard André, Tecumseh, Volcan, and Modeste Guerin.

Hybrid Roses were up to the standard in quality, but not in quantity, for hereabouts it was too early. Walter Clemson of Taunton was the principal exhibitor and no new varieties were noted.

Hybrid Tea Roses are deservedly increasing in popularity. T. N. Cook, Albert Geiger, and Wm. Sim were the principal exhibitors. Very few new varieties were noted. There were very fine blooms of Killarney, pink and white; the Lyon Rose, unique coppery pink; Mrs. Ward, coppery yellow; Richmond, red; J. Mock, full double pink; D. P. Roberts, coppery pink; Radiance, silvery pink; Pharisaer, salmon-pink; and Florence Pemberton, creamy pink.

Herbaceous flowers were shown in quantity by the Bay State Nurseries, Eastern Nurseries, Blue Hill Nurseries, and the Weld Garden. The best noted were *Helenium Hoopesii*, *Erigeron*

speciosum, *Campanula persicifolia* in variety, *Campanula macrantha*, *C. rotundifolia*, *Dianthus plumarius* in variety, *Heuchera sanguinea*, *Valeriana officinalis*, Oriental and Iceland Poppies, *Iris orientalis* Snow Queen, *Oenothera fruticosa* in variety, *Aconitum napellus*, *Sidalcea candida*, double and single varieties of *Pyrethrum roseum*, *Primula japonica*, *Achillea tomentosa*, *A. manchurica*, *Amsonia Tabernaemontana*, and *Spiraea Ulmaria*.

Some neatly arranged baskets of Roses were shown by Albert Geiger and Mrs. N. P. Cutler. Thaddeus Hall of Wellesley Hills showed a select lot of varieties of *Dianthus plumarius*, the result of many years of careful selection. E. B. Dane had a neatly arranged exhibit of Orchids, including *Odontoglossum crispum*, *O. Alexandrae*, Miltonias, *Cattleya Mossiae*, *Epidendrum vitellinum*, *Cypripedium Schroderae*, and *Oncidium varicosum Rogersii*.

Sweet Pea Exhibition.

The Sweet Pea Show was held on July 10–11. It was not up to the mark. Wet weather in this vicinity had seriously interfered with the best development of the flowers. Edwin Jenkins of Lenox was the only exhibitor whose display compared with the best of previous years.

There were large displays of wild flowers which were of much interest to the visitors. A cultural Silver Medal was awarded George Melvin of Framingham for an unusually well-grown specimen of *Odontoglossum laeve*, a rare species with an unusually large spike carrying 47 flowers. The sepals and petals are cinnamon brown, banded with yellow, lip white and violet. It is quite fragrant.

The displays of *Iris Kaempferi* were meagre and much below in quality those of previous years.

W. N. Craig of the Faulkner Farm showed well-grown specimens of *Trachelium caeruleum*. This is a good old-fashioned plant of great decorative value.

Gladiolus Exhibition.

Considering the bad weather Gladioli at the show of August 8 were in very good condition. Growers have the advantage that they can bring under cover what they intend to exhibit a few days ahead, and the flowers will show up better for it. With Phloxes, shown on the same date, it was different. They could not very well be brought in to open, so they were in poor condition.

C. F. Fairbanks of Milton was a new exhibitor of Gladioli. He is collecting the best from everywhere and showed many beautiful varieties. His collection included Pink Beauty; Daisy Rand, salmon-red; Panama, clear pink; C. W. Moulton, magenta-red; Myrtle, tinted pink; America, light pink; Baron Jos. Hulet, deep purple; Fair Columbia, violet-pink; Halley, salmon-red; Prophetess, white, red throat; Prince of Orange, striped orange-red; and several promising varieties under numbers.

Wm. Sim set up an effectively arranged group including all the best commercial sorts. The spikes were bold and handsome. showing very good culture. In his group were Panama; Fascination, light salmon-pink; Lemon Drop; Mrs. Frank Pendleton, rose pink; Myrtle; Mrs. Francis King, scarlet; Florence, violet, white spot; Europa, extra fine white; Mrs. Beecher, red; Amaryllis fine large red self.

The Primulinus hybrids of Gladiolus are getting rather common. The peculiar hood-like character of the flower, in color shading from creamy yellow to orange red, is distinctly effective when used for decorative purposes. For vase work it is better than the large-flowered varieties. Hybridists are trying to flatten out the flowers of the Primulinus type, an achievement we think that would be a misfortune rather than a boon. As with Carnations, and some other florists' flowers, the tendency of hybridists is to coarseness rather than refinement of color and form.

R. G. Swett of Saxonville made a pretty display of new Gladioli, including Niagara, primrose yellow; Schwaben, yellow; Lady Montague, creamy red markings; Elegance, red striped; Liebesfeuer, red; Empress of India, maroon; Belgian King, sulphur-pink; Blue Jay; Princeps, red, white blotch; Glory of Noordwijk, sulphur tinted.

The Blue Hill Nurseries made a very interesting display of various forms of Heather. The Jennison estate of Natick exhibited a new white Phlox for which was awarded a First Class Certificate of Merit. Chamberlain and Gage of Wellesley and Clark W. Brown of Ashland had displays of Gladioli.

Dahlia Exhibition.

The Dahlia Show, September 11, attracted the usual assemblage of enthusiasts. The entries were full and competition close. Owing no doubt to a very favorable season for Dahlias the flowers were of a high order of merit. The best Dahlias usually come from near the coast. It is evidently a seashore plant.

New developments in the Cactus, Peony-Flowered, and Decorative classes were noticeable, but other classes appeared simply to hold their own.

Among new exhibitors were Lemont D. Litchfield of Needham, F. P. Webber of Newport, R. I., Miss Fanny Foster of Newport with new varieties in the Decorative class, Mary C. Caswell of Concord, N. H., and T. H. Snow of Boston, who exhibited seedling Dahlias.

Among the older exhibitors were W. D. Hathaway, E. F. Dwyer, J. K. Alexander, G. H. Walker, Mrs. L. A. Towle, Thos. M. Proctor, and the veteran H. F. Burt of Taunton.

The Mt. Desert Nurseries of Bar Harbor, Maine, was awarded a Certificate of Honorable Mention for an artistic display of cut flowers set up in bamboo stands. The flowers exhibited were *Artemisia lactiflora*, *Rudbeckia nitida*, *Aconitum Wilsoni*, *Aconitum Fischeri*, *Veronica longifolia* var. *subsessilis*, *Aster vimineus*, and *Lilium Henryi*.

T. D. Hatfield showed *Buddleia variabilis* var. *magnifica*, from seeds sown last March. The flowers borne on stems four feet long, will certainly put this popular sub-shrub in an impressive light.

G. W. Page of Billerica showed a lot of Perry's new hybrid Asters of the *Novae Belgiae* type, among which were some that came over on the Lusitania on her last trip. The Blue Hill Nurseries showed Phlox Sunshine, a pretty salmon-pink variety.

Autumn Exhibition.

The Autumn Exhibition was a success in every way. It was one of the best, if not the very best, in a long series of Fall shows. The Committee of Arrangements is to be commended for the admirable way in which the various exhibits were combined into one harmonius whole.

Specimen Chrysanthemum plants for which this show has been famous in the past are gradually passing, but they will come to the front again, as they have in the past. They are so much in the background nowadays that the Society decided to rename the show "The Grand Autumn Exhibition," since now the show has become famous for other good specimens of the gardener's art.

The first prize for the best chrysanthemum plant in the exhibition went to Galen L. Stone of Marion, for Garza, a white Anemone-flowered variety, which has won more prizes at the Boston Shows than any other Chrysanthemum in cultivation. First prize for best yellow-flowered variety, went to Mrs. C. G. Weld for yellow Garza and first for best pink, to A. M. Davenport for Caprice. For best six specimens, to Jason S. Bailey with Enguehard, Wm. Duckham, Theo, Annie Laurie, Yellow Garza, and Lady Lydia.

R. & J. Farquhar & Co. put up an artistic group of flowering and foliage plants. The Chrysanthemums were mostly single-flowered varieties. *Salvia Bethelli,* with showy bracts and flowers of pink, was most effectively used. With Palms, Ferns, Bay Trees, Pandanus, and other foliage plants a pretty combination was made.

Among the groups for private gardeners, Wm. Thatcher, gardener to Mrs. J. L. Gardner, was first. Conspicuous in his group was a fine lot of *Lilium lancifolium;* and Bamboo plants and Jerusalem Cherries were most effectively used.

It was "nip and tuck" between A. M. Davenport and the W. W. Edgar Co. for first in the class for the best decorative group for commercial growers. Davenport's group was most effectively arranged and included Begonia Gloire de Lorraine, Begonia Mrs. Heal, the latter well placed, making the most of its unique color, for effect. Hanging baskets were another very attractive feature.

Edgar's group was noteworthy for the fine quality of the material

used. It included specimen English Ivy, Chrysanthemums, Bays, Palms, Ferns, Crotons, Dracaenas, Heliotropes, and a general lot of foliage plants.

Breck Robinson Co. made an extensive display of evergreens in pots and tubs, Junipers being the feature.

Old Town Nurseries also showed evergreens, Spruces, Yews, Pines, Firs, Thuyas, Cotoneasters, edged with *Pachysandra terminalis* and *Euonymus radicans*.

The Japanese florists, Kameyama and Serada of Cambridge, made a pretty display, but it was disappointing, since it was expected they would show something of the Japanese art in material and arrangement. As it was, their arrangement differed little from ordinary Western methods.

Galen L. Stone's plants of the White Begonia Gloire de Lorraine Turnford Hall, were the best we have seen of this variety.

E. S. Webster's specimens of Begonia Mrs. Heal were magnificent. Mr. Downs, the gardener, eclipsed all his previous efforts in growing specimens of this difficult variety.

F. P. Putnam's single Chrysanthemums were the best he has ever shown here.

It amounted to a "toss up" between F. J. Dolansky's and Wheeler's Orchid groups. It is a remarkable fact that both exhibitors were commercial growers, yet no private estates could excel them.

A First Class Certificate of Merit was awarded to E. B. Dane and A. W. Preston for the double hybrid Cattleya Moira.

(*Cattleya Bowringiana* × *Cattleya Dowiana* var. *Chrysotoxa*) *Mantinii*.

Cattleya labiata × *Laelia tenebrosa*) *Fabia*.

× = Moira.

Color,— rosy purple, deeper lip, veined golden.

Harry E. Converse was the principal exhibitor of large blooms. In size and finish they were the equal of any previously seen here. These big blooms are a great attraction, but they have little decorative value.

The varieties of Chrysanthemums which won the prizes for long-stemmed blooms in vases were, Pink, Chieftain; Red, W. S. Quittenton; White, Beatrice May; Yellow, Wm. Duckham.

The prize for the most artistic vase of Chrysanthemums, with foliage, arranged for decorative effect, should bring a better response than has hitherto been accorded. What we have had so far are big blooms with Oak leaves, a by no means pleasing combination. Something different should be expected from the latitude given in the wording of the Schedule.

The prize for examples of the various ways flowers may be used to decorate the home brought better returns. All the exhibits in this class were excellent. The prize went to the most costly display, but there was a difference of opinion amongst the visiting public as to whether or not the exhibits in which a lesser number of less expensive flowers were used, were most fitting to express the idea suggested in the Schedule.

Leuthy's commercial group of pretty decorative plants helped very much to relieve the otherwise flatness of the Lecture Hall in which the overflow exhibits were staged.

A very fine vase of the new Mrs. Moorfield Story Rose, a blush pink of the Mme. de Watteville type, was displayed by the Waban Rose Conservatories of Natick.

The Hadley Rose was shown in its very best condition by the Montgomery Company of Hadley. The Society has honored it at previous shows and it upholds the honors bestowed in excellent style. Its color is velvety crimson, and it is the handsomest and most fragrant Rose in cultivation.

The Waban Rose Conservatories again showed the Rose, Mrs. Charles Russell and its deep pink sport, Mrs. Bayard Thayer, and these were very much admired.

The window box, as exemplified by Mr. Palmer of Brookline, had distinct merit.

A First Class Certificate of Merit went to Mr. E. S. Webster, Wm. Downs, gardener, for Begonia Optima. It is one of the Mrs. Heal type, with salmon-red flowers, a gem of the first water.

The table decorations, on the whole, were an improvement on recent years. Wm. Sim made a display of Pansies, such as he alone can make. Wax Brothers' Mantel decoration was in excellent taste.

Two trained specimens of the Heavenly Blue Morning Glory, from Mrs. C. G. Weld, came in for much admiration. They were nearly five feet tall, covered with hundreds of flowers and buds.

A First Class Certificate of Merit was awarded Gen. S. M. Weld for *Dracaena indivisa* var. *Parei*, a broad leaved variety, exceeding in decorative value the type.

The Carnation growers were in force and competition was close. A. A. Pembroke, Strouts, M. A. Patten, and S. J. Goddard divided the honors. The first prize for the best six varieties went to A. A. Pembroke, with matchless, white, Benora, variegated, Champion, red, Alice, pink, Yellow Prince, and Pink Delight.

T. D. HATFIELD
ARTHUR H. FEWKES
DONALD MCKENZIE
JAMES MARLBOROUGH
WILLIAM NICHOLSON
WILLIAM SIM

Committee on Plants and Flowers.

PRIZES AND GRATUITIES AWARDED FOR PLANTS AND FLOWERS.

1915.

Midwinter Flower Show.

February 6 and 7.

Begonia Gloire de Lorraine, or any of its varieties.— Six plants in pots:
1st, Mrs. J. L. Gardner, $8; 2d, W. W. Edgar Co., $6; 3d, E. A. Clark, $4.

Freesias.— Six eight-inch pots or pans:
1st, Mrs. Frederick Ayer, $6; 2d, Miss Cornelia Warren, $4; 3d, Mrs. Lester Leland, $3.

Primula sinensis.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, William Whitman, $6; 3d, Mrs. J. L. Gardner, $4.

Primula stellata.— Eight plants in not less than six-inch pots:
1st, Mrs. J. L. Gardner, $8; 2d, William Whitman, $6.

Primula malacoides.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, E. S. Draper, $6; 3d, Mrs. Frederick Ayer, $4.

Primula obconica.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, William Whitman, $6; 3d, Mrs. J. L. Gardner, $4.

Roman Hyacinths.— White, eight six-inch pots:
1st, Mrs. J. L. Gardner, $6; 2d, William Whitman, $4; 3d, Weld Garden, $3.

Polyanthus Narcissus.— Six-eight-inch pots:
1st, Mrs. J. L. Gardner, $6.

Orchids.— Calanthes, six pots, in bloom:
1st, Mrs. J. L. Gardner, $10.

Three plants, other than Calanthes:
1st, Weld Garden, $10; 2d, J. T. Butterworth, $8; 3d, Mrs. J. L. Gardner, $6.

Specimen plant in bloom, other than Calanthes:
1st, Weld Garden, $5; 2d, J. T. Butterworth, $4; 3d, Mrs. J. L. Gardner, $3.

Carnations.— Vase of fifty cut blooms, not less than five varieties, with foliage:
1st, S. J. Goddard, $10; 2d, A. A. Pembroke, $6.

Vase of twenty-five cut blooms, not less than three varieties (for private gardeners only):
1st, Mrs. Frederick Ayer, $5; 2d, Mrs. Frederick Ayer, $4; 3d, E. A. Clark, $3.
Fifty blooms any white variety:
1st, Strouts, $6; 2d, A. A. Pembroke, $4.
Fifty blooms any light pink variety:
1st, A. A. Pembroke, $6; 2d, S. J. Goddard, $4.
Fifty blooms any rose pink variety:
1st, Strouts, $6; 2d, M. A. Patten Co., $4.
Fifty blooms any fresh pink variety:
1st, J. A. Nelson, $6; 2d, Strouts, $4.
Fifty blooms any dark pink variety:
1st, A. A. Pembroke, $6; 2d, Strouts, $4.
Fifty blooms any scarlet variety:
1st, Strouts, $6; 2d, S. J. Goddard, $4.
Fifty blooms, any crimson variety:
1st, Strouts, $6; 2d, A. A. Pembroke, $4.
Fifty blooms any white variegated variety:
1st, A. A. Pembroke, $6; 2d, J. A. Nelson, $4.
Fifty blooms any yellow or yellow variegated variety:
1st, A. A. Pembroke, $6.

VIOLETS.— Bunch of one hundred blooms of any single variety:
1st, Esty Bros., $3; 2d, William Sim, $2.

Gratuities:

Mrs. Frederick Ayer, display of Heaths, $5.
" " " specimen *Acacia heterophylla*, $3.
E. S. Draper, Begonia Sutton's Crimson Bedder, $2, and Honorable Mention.
W. W. Edgar Co., display of plants in bloom, $8.
William Whitman, " " " " " $8.
Miss Cornelia Warren, " " " " " $5.
Walter Angus, display of Camellias, $1.

SPRING EXHIBITION.

MARCH 18, 19, 20, AND 21.

AZALEA INDICA.— Four plants, not less than thirty-six inches in diameter:
1st, William Whitman, $15; 2d, W. W. Edgar Co., $10.
Specimen plant, not less than thirty-six inches in diameter:
1st, Miss Cornelia Warren, $10; 2d, A. W. Preston, $6.

PALMS.— Pair in pots or tubs:
1st, Mrs. Frederick Ayer, $12; 2d, William Whitman, $10; 3d, Weld Garden, $8.
Specimen palm:
Weld Garden, $10.

ERICAS.— Six plants in not less than three species:
1st, Mrs. Frederick Ayer, $12; 2d, Miss Cornelia Warren, $8.

ACACIAS.— Group of plants in bloom to occupy one hundred square feet:
1st, Mrs. Frederick Ayer, $25; 2d, Mrs. Frederick Ayer, $15.
Specimen plants in bloom:
1st, Weld Garden, $8; 2d, Mrs. Frederick Ayer, $6; 3d, Mrs. Frederick Ayer, $4.

HYDRANGEAS.— Collection, not less than six varieties, in not less than eight-inch pots:
1st, W. W. Edgar Co., $15.

PRIMULA ACAULIS.— Six plants:
3d, Mrs. J. L. Gardner, $4.

HARD-WOODED GREENHOUSE PLANT.— Specimen plant, other than Acacias, Azaleas, and Ericas:
Miss Cornelia Warren, $10.

RAMBLER ROSES.— Three plants, distinct varieties:
1st, M. H. Walsh, $15; 2d, M. H. Walsh, $10.

GROUP OF ROSES.— Not less than twelve plants, all classes admissible:
1st, Thomas Roland, $50; 2d, W. W. Edgar Co., $40.

CYCLAMENS.— Twelve plants in not over seven-inch pans:
1st, Mrs. Lester Leland, $15; 2d, Mrs. J. L. Gardner, $10; 3d, Mrs. C. G. Weld, $6.
Six plants, in not over ten-inch pans:
1st, Mrs. Lester Leland, $20; 2d, Mrs. J. L. Gardner, $15; 3d, E. A. Clark, $10.
Specimen plant:
E. A. Clark, $5.

CINERARIAS.— Grandiflora type, six plants:
1st, Mrs. C. G. Weld, $12; 2d, E. A. Clark, $8; 3d, Mrs. J. L. Gardner, $6.
Specimen plant:
Mrs. J. L. Gardner, $5.
Stellata type, six plants:
1st, Mrs. J. L. Gardner, $12; 2d, William Whitman, $8.
Specimen plant:
Mrs. J. L. Gardner, $5.

SCHIZANTHUS.— Six plants:
1st, E. A. Clark, $8; 2d, Miss Cornelia Warren, $6; 3d, Mrs. J. L. Gardner, $4.

HYACINTHS.— Six pans, not exceeding ten inches in diameter, six bulbs of one distinct variety in each pan:

1st, William Whitman, $12; 2d, E. A. Clark, $8; 3d, Mrs. J. L. Gardner, $6.

Single pan, not exceeding twelve inches in diameter, ten bulbs of one variety:

1st, A. F. Estabrook, $4; 2d, E. A. Clark, $3; 3d, E. A. Clark, $2.

Single pan, not exceeding ten inches in diameter, six bulbs of one variety:

1st, William Whitman, $3; 2d, E. A. Clark, $2; 3d, E. A. Clark, $1.

Two eight-inch pans, two distinct varieties (for amateurs only):

1st, Miss M. A. Rand, $5; 2d, H. L. Rand, $3; 3d, Miss M. A. Rand, $2.

SINGLE EARLY TULIPS.— Six eight-inch pans, one distinct variety in each:

1st, William Whitman, $10; 2d, A. W. Preston, $8; 3d, William Whitman, $6.

Joost van Vondel, white, three eight-inch pans:

1st, Mrs. J. L. Gardner, $5; 2d, A. F. Estabrook, $3.

Any other white variety:

1st, William Whitman, $5; 2d, A. F. Estabrook, $3; 3d, A. W. Preston, $2.

Mon Tresor:

1st, William Whitman, $5; 2d, A. W. Preston, $3.

Any other yellow variety:

1st, Mrs. J. L. Gardner, $5; 2d, William Whitman, $3; 3d, A. W. Preston, $2.

Vermilion Brilliant:

1st, A. W. Preston, $5.

Any other red variety:

1st, William Whitman, $5; 2d, A. F. Estabrook, $3; 3d, A. W. Preston, $2.

Keizerkroon:

1st, William Whitman, $5; 2d, J. T. Butterworth, $3; 3d, A. F. Estabrook, $2.

Pink Beauty:

1st, William Whitman, $5; 2d, Mrs. J. L. Gardner, $3; 3d, A. W. Preston, $2.

Any other pink or pink and white variety:

1st, Mrs. J. L. Gardner, $5; 2d, William Whitman, $3; 3d, A. W. Preston, $2.

Duchess of Parma:

1st, William Whitman, $5; 2d, A. F. Estabrook, $3.

Two eight-inch pans, two varieties (for amateurs only):

1st, Miss M. A. Rand, $5; 2d, H. L. Rand, $3; 3d, Miss M. A. Rand, $2.

DOUBLE TULIPS.— Six eight-inch pans in not less than three varieties:

1st, William Whitman, $10; 2d, A. W. Preston, $8; 3d, A. F. Estabrook, $6.

NARCISSUSES.— Collection of Large Trumpet varieties, twelve eight-inch pots, one distinct variety in each:

1st, William Whitman, $12; 2d, A. W. Preston, $10.

Large Trumpet varieties, four eight-inch pots, one distinct variety in each:
1st, William Whitman, $6; 2d, A. W. Preston, $4.
Collection of Short Trumpet varieties, ten eight-inch pots, one distinct variety in each:
1st, William Whitman, $12; 2d, A. W. Preston, $10.
Short Trumpet varieties, four eight-inch pots, one distinct variety in each:
1st, A. W. Preston, $6; 2d, William Whitman, $4.
Two eight-inch pans, two varieties (for amateurs only):
1st, Miss M. A. Rand, $3; 2d, Miss M. A. Rand, $2; 3d, H. L. Rand, $1.

CROCUS.— Three eight-inch pans, one distinct variety in each:
1st, Miss M. A. Rand, $4; 2d, Mrs. J. L. Gardner, $3.

LILY OF THE VALLEY.— Six six-inch pots:
1st, J. T. Butterworth, $6; 2d, J. T. Butterworth, $4; 3d, Mrs. C. G. Weld, $3.

AMARYLLIS.— Twelve pots, distinct varieties:
1st, Mrs. J. L. Gardner, $10.

LILIUM LONGIFLORUM.— Six pots:
1st, W. T. Walke, $10; 2d, Mrs. Frederick Ayer, $8; 3d, Mrs. C. G. Weld, $6.

GENERAL DISPLAY OF SPRING BULBOUS PLANTS.— All classes, to be arranged with foliage plants:
1st, Weld Garden, $30; 2, Mrs. J. L. Gardner, $20.

FORCED BULBS (for amateurs only).— Six pans, six inches in diameter, grown without the aid of a frame or greenhouse:
1st, Miss M. A. Rand, $10; 2d, Miss M. A. Rand, $8; 3d, H. L. Rand, $6.

ORCHIDS.— Group of plants arranged for effect with ferns or other foliage plants, to cover not less than fifty square feet:
1st, Mrs. C. G. Weld, $30, and Silver Medal; 2d, F. J. Dolansky, $25, and Bronze Medal; 3d, J. T. Butterworth, $20.
Six plants:
1st, E. B. Dane, $8; 2, F. J. Dolansky, $6.
Specimen plant:
1st, Miss Cornelia Warren, $6; 2d, F. J. Dolansky, $4; 3d, Miss Cornelia Warren, $2.

ARTISTIC DISPLAY OF FOLIAGE AND FLOWERING PLANTS.— Not exceeding two hundred and fifty square feet:
1st, Weld Garden, $50; 2d, A. M. Davenport, $30.

ROSES IN VASES.— Twenty-five blooms, any red rose other than American Beauty or Richmond:
1st, S. J. Reuter & Son, $12.
Twenty-five blooms of Killarney, or any of its pink sports:
1st, Joseph Heacock Co., $12; 2, A. N. Pierson Co., $8.

Twenty-five blooms white, or any white sport of Killarney:
1st, Joseph Heacock Co., $12; 2d, A. N. Pierson Co., $8.
Twenty-five blooms of Lady Hillingdon:
1st, Joseph Heacock Co., $12.
Twenty-five blooms of Mrs. Charles Russell:
1st, Waban Rose Conservatories, $12.
Twenty-five blooms of Mrs. Aaron Ward:
1st, A. N. Pierson Co., $12.
Twenty-five blooms of any other pink variety:
1st, Joseph Heacock Co., $12; 2d, J. W. Young, $8.
Twenty-five blooms of any new named variety not in commerce:
1st, Waban Rose Conservatories, Mrs. Moorfield Storey, Silver Medal.

CARNATIONS.— Vase of one hundred cut blooms of one variety, with foliage:
1st, Albert Roper, Alice Coombs, $12; 2d, A. A. Pembroke, Matchless, $8.
Fifty blooms, any named crimson variety:
1st, J. A. Nelson, Harry Fenn, $5; 2d, M. A. Patten, Princess Dagmar, $4.
Fifty blooms, any named dark pink variety:
1st, M. A. Patten, Rosette, $5; 2d, A. A. Pembroke, Gorgeous, $4.
Fifty blooms, any named light pink variety:
1st, A. A. Pembroke, Philadelphia, $5.
Fifty blooms, any named flesh-pink variety:
1st, A. A. Pembroke, Pink Delight, $5; 2d, J. A. Nelson, Pink Delight, $4.
Fifty blooms, any named scarlet variety:
1st, J. A. Nelson, Beacon, $5; 2d, M. A. Patten, Beacon, $4.
Fifty blooms, any named white variegated variety:
1st, J. A. Nelson, Benora, $5; 2d, M. A. Patten, Benora, $4.
Fifty blooms, any named yellow variety:
1st, A. A. Pembroke, Yellow Prince, $5.
Fifty blooms, any named white variety:
1st, A. A. Pembroke, Matchless, $5; 2d, J. A. Nelson, White Enchantress, $4.
Artistic display of Carnations:
1st, Penn, the Florist, $50.

VIOLETS.— Bunch of one hundred blooms of any single variety:
1st, Esty Bros., $3; 2d, Edward Bingham, $2.
Bunch of one hundred blooms of any double variety:
1st, Edward Bingham, $3; 2d, J. T. Gale, $2.

SWEET PEAS.— Fifty sprays of any white variety:
1st, William Sim, $4; 2d, Ernest Townsend, $3.
Fifty sprays, any light pink variety:
1st, William Sim, $4; 2d, Ernest Townsend, $3.
Fifty sprays, any deep pink variety:
1st, William Sim, $4; 2d, Ernest Townsend, $3.

Fifty sprays, any scarlet variety:
1st, William Sim, $4.
Fifty sprays, any lavender variety:
1st, William Sim, $4.

MARGUERITES.— One hundred blooms, yellow:
1st, James Wheeler, $6.

ANTIRRHINUMS.— Vase of twenty-five spikes:
1st, Mrs. C. G. Weld, $6; 2d, F. W. Fletcher, $4.

CAMELLIAS.— Collection of twelve blooms:
1st, Walter Angus, $5; 2d, Ernest Townsend, $4.

GARDENIAS.— Twelve blooms:
1st, Mrs. Frederick Ayer, $5; 2d, Ernest Townsend, $4.

For the best table decoration laid for eight covers, to be awarded on the first, second, and third days:
(First day) 1st, Edward MacMulkin, $20; 2d, Mrs. Duncan Finlayson, $10. (Second day) 1st, Mrs. S. J. Coram, $20; 2d, Edward MacMulkin, $10. (Third day) 1st, Wax Bros., $20; 2d, Mrs. S. J. Coram, $10.

MANTEL DECORATION:
1st, Penn, the Florist, Silver Medal; 2d, Sidney Hoffman, Bronze Medal.

Gratuities:

Thomas Roland, display of hard-wooded greenhouse plants, $25, and Silver Medal.
M. H. Walsh, collection of trained Roses, $100.
Mrs. Frederick Ayer, group of Cytisus and Heaths, $5.
Mrs. C. G. Weld, two plants *Cytisus racemosus*, $5.
Faulkner Farm, collection of Orchids, $10.
Miss Cornelia Warren, three plants *Dendrobium nobile*, $3.
William Sim, display of Violets, $5.
W. T. Walke, display of new Hydrangeas, $5.
H. J. Borowski, display of Cyclamen, $5.
E. A. Clark, display of Cyclamen, $4.
T. T. Watt, pair *Polypodium musaefolium*, $2.
A. W. Preston, display of Bulbs, $2.
Miss Cornelia Warren, display of spring flowering plants, $5.
Faulkner Farm, artistic display of decorative plants and flowers, $10.
Penn, the Florist, florist's display, $10.
H. R. Comley, " " $5.
Boston Cut Flower Co., " " $5.
Sidney Hoffman, " " $3.
Esty Bros., " " $1.
T. T. Watt, display of cut flowers, $2.

May Exhibition.

May 15 and 16.

Calceolarias.— Large Flowered, six varieties:
1st, E. A. Clark, $12; 2d, Mrs. J. L. Gardner, $8; 3d, A. M. Davenport, $5.
Stewartii, six plants:
1st, Mrs. C. G. Weld, $12; 2d, Mrs. Lester Leland, $8; 3d, Miss Cornelia Warren, $5.

Tulips.— Darwin, Collection of twelve varieties, six blooms of each:
1st, Weld Garden, $8; 2d, C. F. Fairbanks, $6; 3d, Mrs. Frederick Ayer, $4.
Late Flowering, other than Darwin, twelve varieties, six blooms each:
1st, Faulkner Farm, $8; 2d, Mrs. Frederick Ayer, $6; 3d, Weld Garden, $4.
Late Flowering, any or all classes, twenty-five varieties, three blooms of of each variety:
1st, Weld Garden, $10; 2d, Mrs. Frederick Ayer, $8.

Hardy Narcissuses.— Twenty-five blooms, Emperor:
1st, Weld Garden, $3; 2d, Mrs. Frederick Ayer, $2; 3d, Mrs. Frederick Ayer, $1.
Twelve blooms Glory of Leiden:
1st, William Whitman, $3; 2d, William Whitman, $2.
Collection of twenty vases of not less than six named varieties:
1st, William Whitman, $8; 2d, Weld Garden, $6.

Pansies.— Forty-eight blooms, not less than twenty-four varieties:
1st, William Sim, $3; 2d, William Whitman, $2; 3d, Miss Cornelia Warren, $1.

Native Plants.— Collection, named, one bottle of each kind:
1st, L. D. Warren, $5; 2d, Mrs. F. C. Upham, $4; 3d, Ruth G. Taylor, $3; 4th, Helena A. Winde, $2.

Gratuities:

Mrs. J. L. Gardner, display of Tulips, $3.
C. F. Fairbanks, " " " $3.
Weld Garden, " " " $3.
Mrs. Frederick Ayer, display of Tulips and Canterbury Bells, $5.
Mrs. C. S. Minot, collection of Narcissuses, $3.
Mrs. Lester Leland, display of Narcissuses, $2.
Mrs. C. G. Weld, display of Calceolarias, $3.
Mrs. J. L. Gardner, display of Gladiolus Blushing Bride, $2.

A. W. Preston, display of *Astilbe floribunda* grown in flats for fireplace decoration, $5.
E. A. Clark, Astilbe Phila, $5.
Miss Cornelia Warren, display of Hydrangeas and Pelargoniums, $5.
E. A. Clark, two specimens Hydrangeas, $3.
Mrs. J. L. Gardner, Hydrangea Radiance, $2.
" " " vase of *Clarkia elegans* Orange Queen, $3.
James Wheeler, vase of Yellow Marguerites, $3.
Miss Cornelia Warren, collection of Iceland Poppies, $1.
Mrs. Frederick Ayer, specimen fern, *Cibotium Schiedei*, $3.
Mrs. E. M. Gill, display of cut flowers, $1.

June Exhibition.

June 5 and 6.

Orchids.— Display of plants in not less than four genera, arranged for effect with foliage plants in a space of forty square feet:
1st, Mrs. J. L. Gardner, $25.
Canterbury Bells.— Twelve plants, in pots:
1st, William Whitman, $10.

H. H. Hunnewell Fund No. 3.

Rhododendrons.— Twelve distinct varieties, one truss of each:
1st, W. C. Winter, $6; 2d, T. C. Thurlow's Sons Co., $4.
Six distinct varieties, one truss of each:
2d, Miss Cornelia Warren, $2.

Josiah Bradlee Fund.

German Irises.— Twenty-four vases of three trusses each, of not less than twelve varieties:
1st, Miss Grace Sturtevant, $5; 2d, T. C. Thurlow's Sons Co., $3; 3d, E. M. Dunphe, $2.
Hardy Herbaceous Flowers.— Twenty-five distinct species and varieties, not less than ten genera:
1st, Weld Garden, $10.
Twenty distinct species and varieties, not less than eight genera:
1st, Weld Garden, $8.

Gratuities:

Miss Cornelia Warren, display of *Oncidium flexuosum* and cut flowers, $5.
F. J. Dolansky, display of Cattleyas, $8.
T. C. Thurlow's Sons Co., display of Rhododendrons, $1.
William Whitman, display of Ghent Azaleas, $1.
Miss Cornelia Warren, display of Canterbury Bells, $5.
Mrs. Frederick Ayer, display of German Iris, Canterbury Bells, and Guelder Rose, $5.
William Whitman, display of German Iris, $5.
Wellesley Nurseries, " " " " $5.
J. K. Alexander, " " " " $5.
T. C. Thurlow's Sons Co., " " " " $5.
E. M. Dunphe, " " " " $2.
Mrs. J. L. Gardner, *Gloriosa Rothschildiana*, $4.
E. B. Dane, pair *Clerodendron Balfouri*, $4.
Mrs. J. L. Gardner, display of Streptocarpus, $3.
Mrs. Frederick Ayer, " " Columbines, $4.
Mrs. E. M. Gill, " " cut flowers, $2.
Helena A. Winde, " " native plants, $1.

Peony Exhibition.

June 12 and 13.

Theodore Lyman Fund.

Herbaceous Peonies.— Collection of twelve named varieties, single, one bloom of each:
1st, Mrs. J. L. Gardner, $5; 2d, William Whitman, $4.
Vase of twenty-five blooms, double, white or blush:
1st, Mrs. E. M. Gill, $6.
Vase of twenty-five blooms, double, any other color:
1st, Mrs. J. L. Gardner, $6.
Collection of twelve named double varieties, one flower of each:
1st, Mrs. J. L. Gardner, $8.

Gratuities:

Mrs. J. L. Gardner, display of Peonies, $3.
Mrs. E. M. Gill, " " " $3.
William Whitman, display of Peonies and Poppies, $3.
T. C. Thurlow's Sons Co., display of Iris and Peonies, $4.

Mrs. Frederick Ayer, display of German Iris, $5.
T. C. Thurlow's Sons Co., display of Iris, $5.
Wellesley Nursery Co., display of German Iris, $5.
William Whitman, display of German Iris, $2.
Mrs. J. L. Gardner, display of Canterbury Bells, $5.
T. C. Thurlow's Sons Co., display of Laburnum, $1.
Eastern Nurseries, display of hardy flowers, $8.
Miss Cornelia Warren, display of cut flowers, $3.

Rose and Strawberry Exhibition.

June 19 and 20.

Herbaceous Peonies.— Collection of twenty named varieties, double, one flower of each:
1st, A. P. Saunders, $12; 2d, T. C. Thurlow's Sons Co., $8.
Collection of ten named varieties, double, three flowers of each:
1st, T. C. Thurlow's Sons Co., $12; 2d, Mrs. F. S. Kellogg, $8.
Specimen bloom, double:
1st, G. N. Smith, $2; 2d, A. P. Saunders, $1.
Collection of twelve named varieties, single, one bloom of each:
1st, T. C. Thurlow's Sons Co., $5.
Collection of six named varieties, double, one flower of each, white:
1st, T. C. Thurlow's Sons Co., $4; 2d, Mrs. C. S. Minot, $2.
Rose pink:
1st, A. H. Fewkes, $4; 2d, T. C. Thurlow's Sons Co., $2.
Salmon pink:
1st, T. C. Thurlow's Sons Co., $4.
Red or Crimson:
1st, T. C. Thurlow's Sons Co., $4.
Vase of twenty-five blooms, double, white or blush:
1st, T. C. Thurlow's Sons Co., $6; 2d, Mrs. J. L. Gardner, $4.
Pink or rose:
1st, T. C. Thurlow's Sons Co., $6; 2d, T. C. Thurlow's Sons Co., $4.
Red or crimson:
1st, T. C. Thurlow's Sons Co., $6.
Collection of twelve named varieties, double, one flower of each (for non-commercial growers only):
1st, William Whitman, $8; 2d, R. C. Morse, $5.
Collection of twelve blooms, pink (for private gardeners only):
1st, A. P. Saunders, $4.
Twelve blooms, white (for private gardeners only):
1st, A. P. Saunders, $4; 2d, S. A. Perkins, $2.

Twelve blooms, red (for private gardeners only):
1st, A. P. Saunders, $4; 2d, William Whitman, $2.
GLOXINIAS.— Six plants, in not less than six-inch pots:
1st, Mrs. J. L. Gardner, $8; 2d, Miss Cornelia Warren, $5.

Theodore Lyman Fund No. 2.

HARDY ROSES.— Collection, named, not less than twenty varieties, filling fifty vases, one rose in each vase:
1st, W. J. Clemson, $20.

John C. Chaffin Fund.

(For amateurs only.)

Best three blooms of any white Hybrid Perpetual rose:
1st, Mrs. B. D. Harris, $6.
Best three blooms of any pink Hybrid Perpetual rose:
1st, Mrs. B. D. Harris, $6; 2d, Mrs. Timothy McDermott, $4.
Best three blooms of any red Hybrid Perpetual rose:
1st, Mrs. B. D. Harris, $6; 2d, Mrs. Timothy McDermott, $4.

Society's Prizes.

Twelve named varieties, three of each:
1st, W. J. Clemson, $15.
Six named varieties, three of each:
1st, T. N. Cook, $8; 2d, Mrs. Frederick Ayer, $5.
Twelve named varieties, one of each:
1st, W. J. Clemson, $5.
Six named varieties, one of each:
1st, T. N. Cook, $4; 2d, W. J. Clemson, $2.
HYBRID TEA ROSES.— Collection of twelve varieties, three blooms each:
1st, Albert Geiger, Jr., $15; 2d, T. N. Cook, $10.
Best three blooms of a Hybrid Tea variety introduced since 1912:
1st, T. N. Cook, $4.
Six blooms, any white variety:
1st, William Sim, $4; 2d, Mrs. Frederick Ayer, $2.
Six blooms, any yellow variety:
1st, William Sim, $4; 2d, T. N. Cook, $2.
Six blooms, any pink variety:
1st, T. N. Cook, $4; 2d, Mrs. Frederick Ayer, $2.

Six blooms, any red variety:
1st, William Sim, $4; 2d, T. N. Cook, $2.
Basket, artistically arranged:
1st, Albert Geiger, Jr., $5; 2d, Mrs. N. P. Cutler, $3.
FOR THE MOST ARTISTIC DECORATION OF ROSES, with rose foliage, to fill space not exceeding fifty square feet:
1st, Mrs. Frederick Ayer, $30; 2d, T. N. Cook, $20.
SWEET WILLIAMS.— Display, eighteen vases of three trusses each, not less than six varieties:
1st, Mrs. J. L. Gardner, $6; 2d, Weld Garden, $4.
HARDY HERBACEOUS FLOWERS.— Twenty-five vases, distinct species and varieties, not less than ten genera:
1st, Weld Garden, $10.
Best display of Hardy Herbaceous Flowers:
1st, Bay State Nurseries, Silver Medal: 2d, Eastern Nurseries, Bronze Medal.
CAMPANULA MEDIUM.— Collection, filling twelve vases, one color in each vase:
1st, William Whitman, $8; 2d, E. B. Dane, $6.

Gratuities:

W. A. Riggs, display of specimen Hydrangeas, $8.
Miss Cornelia Warren, " " " " $5.
William Sim, display of Sweet Peas and Hybrid Tea Roses, $8.
Miss Cornelia Warren, display of Roses, $4.
Blue Hill Nurseries, display of Peonies with *Gillenia stipulacea* (decorated table) $15.
T. C. Thurlow's Sons Co., display of Peonies, $15.
G. N. Smith, " " " $10.
J. K. Alexander, " " " $6.
Mrs. E. M. Gill, " " " $5.
Mrs. J. F. Flood, " " " $2.
William Whitman, " " " $2.
A. H. Fewkes, " " " $2.
Mrs. N. P. Cutler, vase " " $1.
Thaddeus Hall, display of fringed pinks, $2.
Mrs. Frederick Ayer, display of herbaceous flowers, $4.

Sweet Pea Exhibition.

July 10 and 11.

John Allen French Fund.

Sweet Peas.— Twenty-five sprays, any white variety:
1st, Edwin Jenkins, Constance Hinton, $4; 2d, Mrs. T. J. Emery, Etta Dyke, $2.

Twenty-five sprays, any crimson or scarlet:
1st, Edwin Jenkins, King Edward VII., $4; 2d, Mrs. T. J. Emery, Dobbie's Scarlet, $2.

Twenty-five sprays, any carmine:
1st, Edwin Jenkins, Rosabelle, $4; 2d, Mrs. T. J. Emery, John Ingman, $2.

Twenty-five sprays, any yellow:
1st, Edwin Jenkins, Dobbie's Cream, $4; 2d, Col. Charles Pfaff, Primrose Spencer, $2.

Twenty-five sprays, any blue:
1st, Edwin Jenkins, Leslie Imber, $4; 2d, Mrs. T. J. Emery, Alfred Watkins, $2.

Twenty-five sprays, any blush:
1st, Edwin Jenkins, Lady Evelyn Eyre, $4; 2d, Mrs. T. J. Emery, Mrs. Hugh Dickson, $2.

Twenty-five sprays, any deep pink:
1st, Edwin Jenkins, Hercules, $4; 2d, Mrs. T. J. Emery, Margaret Atlee, $2.

Twenty-five sprays, any cream pink:
1st, Mrs. T. J. Emery, Lady Miller, $4; 2d, Mrs. T. J. Emery, Harmony, $2.

Twenty-five sprays, any orange:
1st, Edwin Jenkins, May Unwin, $4; 2d, Mrs. T. J. Emery, Inspector, $2.

Twenty-five sprays, any lavender:
1st, Edwin Jenkins, Don Alvar, $4; 2d, Mrs. T. J. Emery, Lavender, George Herbert, $2.

Twenty-five sprays, any purple:
1st, Edwin Jenkins, Royal Purple, $4; 2d, Col. Charles Pfaff, Royal Purple, $2.

Twenty-five sprays, any maroon:
1st, Edwin Jenkins, Nubian, $4; 2d, Mrs. T. J. Emery, King Manoel, $2.

Twenty-five sprays, any picotee-edged:
1st, Edwin Jenkins, Blue Picotee, $4; 2d, Mrs. T. J. Emery, Dobbie's Blue Picotee, $2.

Twenty-five sprays, any striped or flaked red or rose:
1st, Edwin Jenkins, Senator Spencer, $4.
Twenty-five sprays, any striped or flaked blue or purple:
1st, Edwin Jenkins, Loyalty, $4; 2d, Mrs. T. J. Emery, Mrs. T. W. Warren, $2.
Twenty-five sprays, any bicolor, other than picotee-edged:
1st, Edwin Jenkins, Mrs. Cuthbertson, $4; 2d, Mrs. T. J. Emery, Mrs. Cuthbertson, $2.
For the best decoration of sweet peas:
1st, Penn, the Florist, Silver Medal; 2d, Boston Cut Flower Co., Bronze Medal.

IRIS KAEMPFERI.— Collection of not less than six varieties, filling twenty-five vases:
1st, Dr. Harris Kennedy, $8; 2d, T. C. Thurlow's Sons Co., $6.

HOLLYHOCKS.— Twenty-four blooms, not less than four varieties:
1st, Dr. W. G. Kendall, $3; 2d, Miss Cornelia Warren, $2; 3d, Miss Cornelia Warren, $1.

NATIVE PLANTS.— Collection, named, one bottle of each kind:
1st, L. D. Watson, $5; 2d, Mrs. H. R. Hildreth, $4; 3d, Mrs. F. C. Upham, $3; 4th, M. S. Wheeler, $2.

Society's Prizes.

(For amateurs only.)

SWEET PEAS.— Best vase, white, twelve sprays to a vase:
1st, F. P. Webber, King White, $3; 2d, Miss I. H. Miller, White Spencer, $2.
Best vase, pink:
1st, Miss I. H. Miller, Elfreda Pearson, $3; 2d, Alice M. Hildreth, Elfreda Pearson, $2.
Best vase, dark pink:
1st, F. P. Webber, Margaret Atlee, $3; 2d, Alice M. Hildreth, Margaret Atlee, $2.
Best vase, lavender:
1st, F. P. Webber, R. F. Felton, $3; 2d, Miss I. H. Miller, Asta Ohn, $2.
Best vase, salmon:
1st, Miss I. H. Miller, Edrom Beauty, $3.
Best vase, crimson:
1st, F. P. Webber, Dobbie's Crimson, $3.
Best vase, primrose:
1st, F. P. Webber, Primrose Spencer, $3; 2d, Miss I. H. Miller, Clara Curtis, $2.
Best vase, any other color:
1st, F. P. Webber, Mrs. Cuthbertson, $3; 2d, Miss I. H. Miller, Mrs. Breadmore, $2.

Gratuities:

Wells Beach Sweet Pea Farm, display of Sweet Peas, $3, and Honorable Mention.
Gertrude Schuls, bouquets and two vases Sweet Peas, $2.
Jackson Dawson, single Hollyhocks, $2.
Miss Cornelia Warren, Hemerocallis and Veronica, $1.
T. C. Thurlow's Sons Co., herbaceous flowers, $3.
Mrs. E. M. Gill, display of flowers, $3.
Miss Cornelia Warren, eight plants *Oncidium flexuosum*, $5.
" " " Hydrangeas, $6.

Gladiolus and Phlox Exhibition.

August 7 and 8.

John Allen French Fund.

Perennial Phloxes.— Twelve named varieties, one truss of each:
1st, Blue Hill Nurseries, $5.
General display in not less than thirty vases, named:
1st, Blue Hill Nurseries, $10.
Gladioli.— Twelve named varieties, one spike of each:
1st, C. F. Fairbanks, $5; 2d, Raymond Swett, $3.
Twelve named varieties, one spike of each, for private gardeners only:
1st, C. F. Fairbanks, $5.
Fifty spikes, any named variety, in the Society's vases:
1st, C. F. Fairbanks, $8; 2d, William Sim, $5.
Display of named and unnamed varieties, filling one hundred vases, arranged for effect with any foliage:
1st, William Sim, $15.
Basket or hamper, artistically arranged:
1st, Boston Cut Flower Co., $5.
Annuals.— General display, named, thirty species, filling not less than one hundred bottles:
1st, Mrs. J. L. Gardner, $10.

Special Prizes Offered by the American Gladiolus Society.

Gladioli.— Fifteen correctly named varieties, at least three spikes each, to be competed for by amateurs only:
1st, C. F. Fairbanks, Silver Medal.

Gratuities:—

Chamberlain & Co., display of Gladioli, $5.
C. W. Brown, " " " $3.
R. W. Swett, " " " $3.
J. K. Alexander, display of Dahlias, $10.
Miss Cornelia Warren, display of Phlox and herbaceous flowers, $5.
Mrs. Frederick Ayer, decorative Palms and Ferns, $10.
Mrs. E. M. Gill, display of cut flowers, $3.

Dahlia and Fruit Exhibition.

September 11 and 12.

John Allen French Fund.

Dahlias.— Show and Fancy, twenty-four blooms, named varieties:
1st, J. K. Alexander, $4; 2d, W. D. Hathaway, $3.
Show and Fancy, twelve blooms, named varieties:
1st, W. H. Symonds, $3.
Cactus, twenty-four blooms, named varieties:
1st, W. D. Hathaway, $4; 2d, J. K. Alexander, $3.
Cactus, twelve blooms, named varieties:
1st, Miss Fanny Foster, $3; 2d, G. H. Walker, $2.
Decorative, twenty-four blooms, named varieties:
1st, W. D. Hathaway, $4; 2d, L. D. Litchfield, $3.
Decorative, twelve blooms, named varieties:
1st, G. H. Walker, $3; 2d, Miss M. C. Caswell, $2.
Peony-flowered, twelve blooms, named varieties:
1st, G. H. Walker, $3; 2d, E. F. Dwyer, $2.
Pompon, twenty-four vases of three blooms each, named varieties:
1st, J. K. Alexander, $4; 2d, W. D. Hathaway, $3.
Pompon, twelve vases of three blooms, named varieties:
1st, F. P. Webber, $3; 2d, E. F. Dwyer, $2.
Single, twelve vases of three blooms each, named varieties:
1st, J. K. Alexander, $3; 2d, James Robertson, $2.
Largest and best collection of named varieties, one vase of each:
1st, G. H. Walker, $8; 2d, E. F. Dwyer, $6.
Native Plants.— Collection, named, one bottle of each kind:
1st, Mrs. F. C. Upham, $5; 2d, M. S. Wheeler, $4.

Gratuities:—

Fottler, Fiske, Rawson Co., display of Dahlias and Gladioli, $10.
J. K. Alexander, display of Dahlias, $8.

Mrs. L. A. Towle, display of Dahlias, $5.
G. H. Walker, " " " $2.
J. K. Alexander, vase of Dahlia blooms, $2.
Boston Cut Flower Co., basket of Dahlia blooms, $2.
T. H. Snow, collection of seedling Dahlias, $1.
Albert Geiger, Jr., display of single Asters and Roses, $1.
J. K. Alexander, display of Gladioli, $6.
Blue Hill Nurseries, collection of Phloxes, $2.
G. W. Page, display of hardy Asters, $5.
James Wheeler, display of *Buddleia variabilis*, $1.
W. C. Winter, display of cut flowers, $2.
Miss Cornelia Warren, " " " " $2.
Mrs. N. P. Cutler, " " " " $1..
Mrs. S. J. Kaulkmann, " " " " $1.
T. L. Dean, " " " " $1.

October Show.

October 2 and 3.

Gratuity:—

Blue Hill Nurseries, display of herbaceous flowers, $5.

Autumn Exhibition of Plants, Flowers, Fruits, and Vegetables.

November 4, 5, 6 and 7.

Foliage and Flowering Plants.— Best arranged group, covering three hundred sq. ft.:
1st, A. M. Davenport, $100; 2d, W. W. Edgar Co., $50.
Best arranged group covering one hundred and fifty sq. ft (for private growers only):
1st, Mrs. J. L. Gardner, $50.
Orchids.— Best table of Orchids, both plants and flowers, six or more genera, accurately named:
1st, F. J. Dolansky, $60; 2d, Wheeler & Co., $30.
Six plants, not less than three species:
1st, F. J. Dolansky, $10.
Best specimen Orchid:
1st, F. J. Dolansky, $8; 2d, Miss Cornelia Warren, $6.

EVERGREEN TREES AND SHRUBS.— For the best collection in tubs or pots:
1st, Breck, Robinson Co., $40; 2d, Old Town Nurseries, $20.

CHRYSANTHEMUMS.— Group of plants to cover 200 sq. ft. (Palms and Ferns may be used in arrangement):
1st, Mrs. J. L. Gardner, $60, and Silver Medal; 2d, A. M. Davenport, $40.

Six trained specimen plants, any color or class:
1st, J. S. Bailey, $50.

One trained specimen plant, white:
1st, G. L. Stone, $15; 2d, Mrs. C. G. Weld, $10.

One trained specimen plant, yellow:
1st, Mrs. C. G. Weld, $15; 2d, Mrs. C. G. Weld, $10.

One trained specimen plant, pink:
1st, A. M. Davenport, $15; 2d, J. S. Bailey, $10.

Twenty-five plants, commercial specimens, not less than six varieties, in not over eight-inch pots:
1st, W. H. Elliott, $30; 2d, A. M. Davenport, $20.

Twelve trained plants, in not over eight-inch pots, single-flowering sorts, not less than three varieties:
1st, Mrs. Lester Leland, $30.

BEGONIAS.— Gloire de Lorraine or any of its varieties, six plants:
1st, Mrs. C. G. Weld, $25; 2d, G. L. Stone, $12.

Any other winter-flowering variety: six plants:
1st, A. M. Davenport, $10.

Samuel Appleton Fund.

BEST CHRYSANTHEMUM PLANT on exhibition:
G. L. Stone, Garza, Silver Medal.

Theodore Lyman Fund No. 2.

CHRYSANTHEMUMS.— Twenty-five blooms, of twenty-five distinct varieties, named:
1st, H. E. Converse, $20.

Henry A. Gane Memorial Fund.

For the best vase of blooms of the Mrs. Jerome Jones or the Yellow Mrs. Jerome Jones:
1st, James Nicol, $30.

Society's Prizes.

Twelve blooms, Japanese, named, in vases:
1st, H. E. Converse, $8.

Twelve blooms, Japanese Incurved, named, in vases:
1st, H. E. Converse, $8.
Twelve blooms, Reflexed, named:
1st, H. E. Converse, $8.
Twelve sprays, Anemone, named:
1st, F. P. Putnam, $5.
Twelve vases, Pompon, distinct varieties, six sprays in a vase:
1st, F. P. Putnam, $5.
Vase of ten blooms on long stems, pink, named:
1st, Mrs. Lester Leland, Chieftain, $12; 2d, F. J. Dolansky, Chieftain, $8.
Vase of ten blooms, on long stems, red, named:
1st, W. S. Russell, F. T. Quittenton, $12.
Vase of ten blooms on long stems, white, named:
1st, James Nicol, Beatrice May, $12; 2d, F. J. Dolansky, Wm. Turner, $8.
Vase of ten blooms on long stems, yellow, named:
1st, Mrs. Lester Leland, Mrs. Wm. Duckham, $12; 2d, F. J. Dolansky, Col. D. Appleton, $8.
Vase of ten blooms on long stems, any other color, named:
1st, F. J. Dolansky, Polly Salis, $12.
Collection of sprays of single chrysanthemums, filling twenty-five vases:
1st, F. P. Putnam, $10; 2d, F. P. Putnam, $8.

TABLE DECORATION of eight covers; to be awarded the first, second and third days:
(First day) 1st, F. J. Dolansky, $20; 2d, Mrs. Duncan Finlayson $10. (Second day) 1st, Boston Cut Flower Co., $20; 2d, H. R. Comley, $10. (Third day) 1st, H. R. Comley, $20; 2d, F. J. Dolansky, $10.

TABLE DECORATION of six covers (for private gardeners only); to be awarded Saturday:
1st, Duncan Finlayson, $20; 2d, William Thatcher, $10.

MOST ARTISTIC DISPLAY OF CUT FLOWERS to cover one hundred sq. ft., arranged with any foliage:
1st, Penn, the Florist, $50.

FOR THE BEST MANTEL DECORATION:
1st, Wax Bros., $30; 2d, Penn, the Florist, $15.

CARNATIONS.— Six vases, fifty blooms each, six named varieties:
1st, A. A. Pembroke, $20; 2d, C. S. Strout, $15.
One hundred blooms, mixed varieties:
1st, A. A. Pembroke, $10; 2d, M. A. Patten Co., $6.
Fifty blooms, mixed varieties:
1st, James Wheeler, $5.
Twenty-five blooms, mixed varieties (for private gardeners only):
1st, W. C. Rust, $4; 2d, Mrs. C. D. Sias, $3.

Gratuities:—

Miss Cornelia Warren, group of plants, $4.
Kameyama & Serada, group of plants and flowers, $25.
A. Leuthy & Co., display of Palms, $25.
W. W. Edgar Co., " " " $15.
E. S. Webster, display of Begonia Mrs. Heal, $5.
S. R. Cowey, seedling Chrysanthemums, $3.
Mrs. Lester Leland, vase of Chrysanthemums, $15.
W. A. Riggs, " " " $10.
George Detlefsen, seedling Pompon Chrysanthemums, $1.
W. D. Hathaway, Dahlias, $5.
Edward Winkler, Carnation Morning Glow, $3.
James Wheeler, vase of Carnations, $5.
S. J. Goddard, " " " $4.
Peter Fisher, " " " $3.
A. A. Pembroke, " " " $2.
Waban Rose Conservatories, three vases of Roses, $15.
G. F. Stewart, *Cattleya Trianae*, $1.
Kidder Bros., Violets, $1.
William Sim, Pansies, $5.
Belcher's Flower Shop, table decoration, $2.

Additional Awards.

GOLD MEDAL.

March 18. R. & J. Farquhar & Co., Dutch Garden.

SILVER MEDAL.

January 2. E. B. Dane, *Cattleya Trianae alba.*
" 9. George Melvin, superior cultivation of *Laelia anceps.*
" " F. J. Dolansky, collection of *Cattleya Trianae* varieties.
" " E. B. Dane, Cymbidium Gottianum (*C. eburneum* × *C. insigne*).
February 6. A. Roper, Carnation Alice Coombs.
" 27. E. B. Dane, *Sophro-Cattleya Thwaitesii* (*Sophronitis grandiflora* × *Cattleya Mendelii*).
March 18. T. D. Hatfield, Superior cultivation of *Erica melanthera.*
" " William Sim, artistic display of Pansies.
" " " " " " " Sweet Peas.
" " Walter Hunnewell, Dendrobium Wellesley (*D. nobile murrhiniacum* × *D. nobile* Victoria Regina).

March 18, A. W. Preston, *Brasso-Cattleya Veitchii.*
May 15. F. J. Dolansky, display of *Cattleya Mossiae.*
" " E. B. Dane, *Brasso-Cattleya Warneri.*
" 29. Miss Grace Sturtevant, collection of hybrid Irises.
June 5. Walter Hunnewell, display of Rhododendrons.
" 19. T. C. Thurlow's Sons Co., Peony Cherry Hill.
" " R. & J. Farquhar & Co., artistic display of Peonies.
" " E. B. Dane, artistic display of Orchids.
July 10. R. & J. Farquhar & Co., display of herbaceous plants.
" " Eastern Nurseries, " " " "
" " George Melvin, superior cultivation of *Odontoglossum laeve.*
August 7. C. F. Fairbanks, artistic display of Gladioli.
November 4. N. T. Kidder, superior culture of *Davallia Mooreana.*
" " Waban Rose Conservatories, new Rose Mrs. Bayard Thayer.
" " R. & J. Farquhar & Co., artistic display of plants and flowers.

Bronze Medal.

March 18. Mrs. L. A. Breck, display of Tulips.
" " T. F. Galvin, artistic table decoration.
August 7. J. P. Rooney, seedling Dahlia Mrs. Frederick Grinnell.

First Class Certificate of Merit.

January 2. Donald McKenzie, superior cultivation of *Chysis aurea.*
February 6. Mrs. J. L. Gardner, *Jasminum primulinum.*
" " Weld Garden, *Cymbidium* (*insigne* × *Wiganianum*).
" 27. E. B. Dane, *Odontioda Charlesworthii* (*Odontoglossum Harryanum* × *Cochlioda Noetzliana.*)
March 18. William Sim, Sweet Peas Rose Queen, Anita Wehrmann, Orchid Beauty, Venus, and Mrs. Skaach.
" " Weld Garden, *Cymbidium Pauwelsii.*
" " H. Huebner, new winter-flowering Antirrhinums.
" " Littlefield & Wyman, Carnation Theo.
" " Edward Winkler, Carnation Morning Glow.
May 15. William Thatcher, superior cultivation of *Clarkia elegans* Orange King.
" 29. Miss Grace Sturtevant, collection of hybrid Irises.
June 5. Mrs. Lester Leland, Geranium Mrs. Lester Leland (Lady Roscoe × Mary Pelton).
" " Miss Grace Sturtevant, Iris B. Y. Morrison (Edina × Iris King).
" " " " " " Afterglow (*pallida* × *aurea*).
" " " " " " Oriflamme × Conte de St. Clair.
" " " " " " No. 97 (*Cypriana catrina* × *pallida*).

June 5. H. Stewart, superior cultivation of *Cattleya citrina*.
" 12. Eastern Nurseries, *Potentilla Veitchii*, and *Potentilla fruticosa* var. *parvifolia*.
" 19. W. N. Craig, superior cultivation of Verbena Ellen Willmott.
July 11. W. N. Craig, superior cultivation of *Trachelium caeruleum*.
August 7. W. C. Jennison Estate, new white perennial Phlox Leona.
" " Blue Hill Nurseries, display of *Calluna vulgaris*.
" " George Melvin, superior cultivation of *Epidendrum prismatocarpum*.
November 4. E. S. Webster, new winter-flowering Begonia Optima.
" " A. W. Preston, hybrid Cattleya Moira.
" " E. B. Dane, " " "
" " Littlefield & Wyman, Carnation Theo.

Certificate of Honorable Mention.

March 18. D. R. Craig, display of seasonable plants.
" " Jackson Dawson, hybrid Azalea (*Rhododendron Kaempferi* × *R. amoena*).
" " Walter Hunnewell, *Berberis Wilsonae*.
" " Breck Robinson Co., collection of Cyclamen.
" " Mrs. T. D. Hatfield, *Asparagus plumosus nanus* grown in dwelling house.
May 15. R. & J. Farquhar & Co., *Genista praecox*.
June 19. William Sim, display of Sweet Peas and Hybrid Tea Roses.
July 10. R. & J. Farquhar & Co., *Lilium regale*.

Honorable Mention.

February 6. M. A. Patten Co., Carnation Sunbeam.
" ". N. T. Kidder, seedling Amaryllis.
" 27. E. B. Dane, Cattleya hybrid (*C. Schroderae* × *Thayeriana*).
May 15. S. R. Cowey, display of Geraniums and Carnations.
June 12. Jackson Dawson, Azalea Hazel Dawson (*Rhododendron ledifolium* × *R. Kaempferi*).
August 7. Chamberlain & Co., display of Gladioli.
" " G. B. Gill, seedling Dahlias.
" " R. & J. Farquhar & Co., display of Phloxes and herbaceous flowers.
" " C. F. Fairbanks, display of Gladioli.
" " " " " seedling Gladiolus No. 163.
" " " " " " " No. 55.

September 11. L. C. Parker, seedling Dahlia.
" " Mt. Desert Nurseries, artistic display of hardy flowers.
October 2. Blue Hill Nurseries, Phlox Mrs. James Wheeler.
November 4. Mrs. C. G. Weld, Ipomoea Heavenly Blue.
" " F. E. Palmer, arrangement of window plants.
" " George Detlefsen, new Heliotrope Elsie.
" " " " new Anemone-flowered Chrysanthemum Waverly Star.
" " Gen. S. M. Weld, three plants *Dracaena indivisa* var. *Parei excelsa*.

VOTE OF THANKS.

March 18. Faulkner Farm, display of Cineraria types.
November 4. F. J. Dolansky, *Cattleya labiata* varieties.

REPORT OF THE COMMITTEE ON FRUITS FOR THE YEAR 1915.

By Edward B. Wilder, Chairman.

The weather conditions during the year 1915 have been peculiar and undoubtedly are largely responsible for the partial failure of some of our fruit crops.

While the fruit trees, especially pears, bloomed profusely in some sections the crop was the poorest for many years, owing to weather conditions during the setting of the fruit. The summer drought followed by excessive rains in the early autumn also had its effect, for while water was much needed the larger and sudden precipitation was injurious to the fruit.

Notwithstanding these conditions the displays of fruit have been very encouraging, the steady improvement in the exhibitions and constant increase of interest on the part of the public in them, noted last year, continued to a most gratifying degree.

The finest collection of fruit ever made at a Midwinter Show was seen February 6–7 when there were fifty-three dishes of apples and seventeen dishes of pears on the tables, there being seven entries for a collection of four varieties of winter apples.

A. B. Howard and Son of Belchertown took four out of the five first prizes at this show, including the first prize for four varieties of winter apples, and Mrs. R. Goodnough of West Roxbury favored the Society with a decorative table of fruit and flowers.

The show of fruit at the Spring Exhibition, March 18–21, was a great improvement over last year's show, nearly as many apples being displayed as in February, and all excellent specimens though the lack of space in the hall made the exhibit less effective.

The Strawberry Exhibition, June 19–20, was the poorest the committee has ever seen in the hall, the late frost blighting many of the blossoms and the cold season having a disastrous effect upon the fruit.

Dr. Frederick S. De Lue of Needham, showed a seedling strawberry, not yet introduced, called Judith, for which he was awarded a Silver Medal. Dr. De Lue says,— The Judith strawberry is the earliest and one of the most productive of seven thousand (7,000) seedlings started seven years ago. It is deep rooted and hardy, having stood two winters without mulching, also vigorous after fruiting season.

The foliage is large and light green and plenty of strong healthy runners produced. The fruit is large, even to end of fruiting, and irregularly conical. It is shiny, firm, sweet, and juicy, and of deep red color all the way through and without core. The seeds are small and bright yellow. It is a fine shipper and keeps well on the vines.

Considering the late season and a severe rain storm just before picking the fruit, the display of currants, cherries, and gooseberries at the Sweet Pea Exhibition was very good. Charles S. Smith of Lincoln was awarded prizes for Downer's Late, Coe's Transparent, and Hyde's Seedling cherries. George V. Fletcher of Belmont took first prize for collection of six baskets of currants and Dr. W. G. Kendall of Atlantic first prize for collection of six baskets of gooseberries.

There were fourteen plates of early apples at the Gladiolus and Phlox Exhibition, August 7–8, besides pears, peaches, plums, and blackberries, a very creditable show considering the wet season which was undoubtedly accountable for the lack of melons at any of the shows. We could wish that there might be more interest in exhibiting indoor grapes and other indoor fruit as liberal prizes are offered to encourage growers.

At the Dahlia and Fruit Exhibition, September 11–12, the peaches were very fine, comprising forty-three dishes, with forty-five dishes of plums beside apples and grapes. A. B. Howard and Son took first prize for best collection of fall apples, also for collection of plums other than Japanese. H. A. Clark of Belmont took first prize for best collection of peaches and Myron S. Wheeler of Berlin first prize for collection of Japanese plums. Edward R. Farrar of South Lincoln won first prize for collection of native grapes also four other first prizes for single dishes of named varieties of native grapes. There were three entries for collection of

seasonable fruit arranged for effect with foliage, H. A. Clark being awarded first prize.

The main hall was filled with a fine display of fruit at the show, October 3–4. Derby Farm, Leominster, was awarded first prize for collection of six varieties of fall apples, first prize for collection of six varieties of winter apples, also first prizes for dishes of Baldwin, McIntosh, Jonathan, R. I. Greening, and Roxbury Russet apples, in all a splendid lot of fruit. Elliott and H. Ward Moore of Worcester won first prize for King, Bellflower, and Fameuse, while Edward E. Cole of Greenbush again favored us with a beautiful dish of Maiden Blush apples, taking first prize on this variety and on Golden Russet.

The pear display was very creditable considering the poor crop. F. W. Dahl of Roxbury took first prize for collection of pears, also first prize for Anjou, Angouleme, Clairgeau, Lawrence, Superfin, Urbaniste, and Vicar. Mrs. N. F. Winnele of Belmont took the first prize for Bosc and Seckel.

John Bauernfeind of Medford won first prize for collection of native grapes, also first prize for Agawam, Brighton, Campbell's Early, Herbert, and Niagara. Dr. W. G. Kendall carried off first prize for Green Mountain, Salem, Vergennes, and Charles W. Libby of Medford the first prize for Delaware, Lindley, and Moore's Diamond grapes, while Edward R. Farrar of South Lincoln had the best Concord and Worden. There were also exhibits of peaches, plums, quinces, and native nuts.

Two persons displayed tables of native and foreign fruit arranged for effect, the first prize going to Mrs. R. Goodnough. Jennison's Floral Gardens, Natick, Charles H. Chamberlain, Manager, exhibited their new Everbearing strawberry, Ideal, which seems to be very promising.

A special effort was made by all the committees to make the November Show a Grand Autumn Exhibition in fact as well as in name, and to this end the fruit committee had transferred some of its most prominent features from the October Show to this one. For the largest and best exhibit of apples, not less than ten varieties and five specimens of each, there were two entries, the first prize going to Derby Farm and the second to Elliott and H. Ward Moore. For the best six varieties of winter apples there were three

entries, the first prize being won by Derby Farm, the second by Elliott and H. Ward Moore, and the third by H. C. Fuller of Leominster.

Two entries were made for the collection of apples arranged for decorative effect, Derby Farm taking the first prize and E. M. Bruce of Leominster second prize. The collection of apples in trays was not as large as we could wish, but there was some excellent fruit shown, H. C. Fuller taking first, Derby Farm second, and Parker Bros. of Brookfield third prize.

Mrs. R. Goodnough and F. W. Dahl had tables of native and foreign fruit, the first prize going to Mrs. Goodnough for the most beautiful display which attracted much attention. Many single dishes of apples were also exhibited nearly one hundred in all of this kind of fruit.

F. W. Dahl had the only collection of pears though there were a number of single dishes, but the native grapes were certainly very fine considering the lateness of the season, four entries being made for collection. John Bauernfeind, Charles W. Libby, and Dr. W. G. Kendall respectively won first, second, and third prizes for this class.

L. J. Fosdick of North Carver had a collection of cranberries and three dishes for the half-peck class, winning first prize in both entries.

The quality of the fruit shown during the year has been so good, barring a few exceptions, that your committee feels that the educational value of the monthly shows have been fully demonstrated and are convinced the Society can still do excellent work in this direction.

EDWARD B. WILDER
WILLIAM DOWNS
HAROLD L. FROST
RALPH W. REES

Committee on Fruits.

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1915.

Midwinter Flower Show.

February 6 and 7.

Winter Apples.— Collection of four varieties:
1st, A. B. Howard & Son, $6; 2d, H. A. Clark, $4; 3d, W. H. Atkins, $3.
Two dishes, two varieties:
1st, A. B. Howard & Son, $4; 2d, G. V. Fletcher, $3; 3d, W. H. Atkins, $2.
Dish of one variety:
1st, A. B. Howard & Son, Baldwin, $3; 2d, H. A. Clark, Northern Spy, $2; 3d, Mrs. E. F. Kendall, Baldwin, $1.
Winter Pears.— Collection of four varieties:
1st, A. B. Howard & Son, $5; 2d, F. W. Dahl, $4.
Dish of one variety:
1st, Dr. W. G. Kendall, Bosc, $3; 2d, G. V. Fletcher, Bosc, $2; 3d, Dr. W. G. Kendall, Dana's Hovey, $1.

Gratuities:—

A. B. Howard & Son, Bay State Apples, $1.
Mrs. R. Goodnough, decorative table of fruit and flowers, $8.

Spring Exhibition.

March 18, 19, 20 and 21.

Winter Apples.— Collection of four varieties:
1st, E. M. Bruce, $6; 2d, A. B. Howard & Son, $4; 3d, H. A. Clark, $3.
Two dishes, two varieties:
1st, A. B. Howard & Son, $4; 2d, E. F. Adams, $3; 3d, Parker Bros., $2.
Dish of one variety:
1st, A. B. Howard & Son, Baldwin, $3; 2d, Alden Derby, Baldwin, $2; 3d, Parker Bros., King, $1.

Gratuity:—

A. B. Howard & Son, Apples, $1.

Rose and Strawberry Exhibition.

June 19 and 20.

Strawberries.— Six baskets, one quart each, of six varieties:
1st, G. V. Fletcher, $5.
Two quarts of any variety introduced since 1911:
1st, Louis Graton, $4.
For the best four quarts of any variety:
1st, G. V. Fletcher, Marshall, $8; 2d, Louis Graton, Brandywine, $6.
For the best single plate of any variety, arranged with foliage, twenty-four specimens:
1st, Samuel McMullen, $3; 2d, John Lingley, $2.
For the best new strawberry, not yet introduced, four quarts:
F. S. De Lue, Judith, Silver Medal.
Two quarts of Abington:
1st, Mrs. Frederick Ayer, $3.
Two quarts of Barrymore:
1st, Mrs. Frederick Ayer, $3.
Two quarts of Golden Gate:
1st, G. V. Fletcher, $3.
Two quarts of Marshall:
1st, G. V. Fletcher, $3.
Two quarts of any other variety:
1st, W. C. Winter, Gen. Appleton, $2.
Cherries.— Two quarts of any black variety:
1st, G. V. Fletcher, Guigne Noir, $3.
Two quarts of any white or yellow variety:
1st, J. H. Fletcher, Royal Ann, $3; 2d, Michael Cahalan, Gen Wood, $2.

Gratuity:—

Mrs. R. Goodnough, basket of Strawberries, $3.

Sweet Pea Exhibition.

July 10 and 11.

John A. Lowell Fund.

Cherries.— Two quarts of any red variety:
1st, C. S. Smith, Downers Late, $3; 2d, C. S. Smith, Coe's Transparent, $2; 3d, E. S. Martin, Mercer, $1.

Two quarts of any black variety:
1st, C. S. Smith, Hyde's Seedling, $3; 2d, G. V. Fletcher, Black Tartarian, $2.
Two quarts of any white or yellow variety:
1st, J. H. Fletcher, Royal Ann, $3; 2d, Mrs. M. J. Merrill, Royal Ann, $2.

Society's Prizes.

CURRANTS.— Two quarts of Fays:
1st, E. M. Brewer, $3; 2d, H. A. Clark, $2; 3d, Mrs. Timothy McDermott, $1.
Two quarts of Perfection:
1st, Oliver Ames, $3; 2d, H. A. Clark, $2.
Two quarts of any other red variety:
1st, T. D. Hatfield, Cherry, $3; 2d, G. V. Fletcher, Cherry, $2.
Two quarts of White Grape:
1st, Dr. W. G. Kendall, $3; 2d, W. C. Winter, $2; 3d, Oliver Ames, $1.
Collection of six baskets, one quart each, not less than four varieties:
1st, G. V. Fletcher, $5.
GOOSEBERRIES.— Collection of six baskets, one quart each, not less than three varieties:
1st, Dr. W. G. Kendall, $5; 2d, W. J. Clemson, $4.
Two quarts of Columbus:
1st, Dr. W. G. Kendall, $3; 2d, Oliver Ames, $2; 3d, W. C. Winter, $1.
Two quarts of Downing:
1st, Oliver Ames, $3; 2d, Mrs. Timothy McDermott, $2; 3d, Mrs. A. A. Warburton, $1.
Two quarts of Industry:
1st, Dr. W. G. Kendall, $3; 2d, W. J. Clemson, $2.
Two quarts of Triumph:
1st, John Bauernfeind, $3; 2d, J. S. Chase, $2.
Two quarts of any other variety:
1st, John Bauernfeind, Chatauqua, $3; 2d, Dr. W. G. Kendall, Bates, $2; 3d, W. C. Winter, Chatauqua, $1.
COLLECTION OF FRUIT.— Largest and best collection of midsummer fruits, arranged with their own foliage:
2d, G. V. Fletcher, $6.

Gratuity:—

Mrs. R. Goodnough, basket of fruit, $5.

Gladiolus and Phlox Exhibition.

August 7 and 8.

Apples.— Chenango:
2d, W. C. Winter, $2.
Duchess of Oldenburgh:
1st, H. A. Clark, $3; 2d, M. S. Wheeler, $2; 3d, E. L. Lewis, $1.
Red Astrachan:
1st, M. S. Wheeler, $3; 2d, E. L. Lewis, $2; 3d, Michael Cahalan, $1.
Sweet Bough:
1st, G. V. Fletcher, $3; 2d, D. R. Craig, $2.
Yellow Transparent:
3d, Michael Cahalan, $1.
Williams:
1st, J. H. Fletcher, $3; 2d, Hittinger Fruit Co., $2; 3d, W. C. Winter, $1.
Any other variety:
1st, W. Heustis & Son, $3.

Pears.— Clapp's Favorite:
1st, G. V. Fletcher, $3; 2d, Mrs. Elbridge Torrey, $2; 3d, H. A. Clark, $1.
Any other variety:
1st, Mrs. N. P. Cutler, Summer Doyenne, $3; 2d, W. C. Winter, Giffard, $2; 3d, F. W. Dahl, Dearborn Seedling, $1.

Peaches.— Greensboro:
1st, G. V. Fletcher, $3.
Any other variety:
1st, H. A. Clark, Mayflower, $3; 2d, G. V. Fletcher, Mayflower, $2.

Plums.— Japanese:
1st, M. S. Wheeler, $3; 2d, W. C. Winter, $2.
Burbank:
1st, M. S. Wheeler, $3; 2d, W. C. Winter, $2; 3d, E. L. Lewis, $1.
Any other variety:
1st, E. L. Lewis, Red June, $3; 2d, M. S. Wheeler, Red June, $2; 3d, Dr. W. G. Kendall, Shiro, $1.

Blackberries.— Two quarts of any variety:
1st, M. S. Wheeler, $3; 2d, C. W. Brown, $2.

Peach Tree in Fruit:
1st, Miss Cornelia Warren, $6.

Plum Tree in Fruit.
1st, Miss Cornelia Warren, $6.

Gratuities:—

W. C. Jennison Estate, C. H. Chamberlain, manager, Ideal Everbearing Strawberry, $1.

W. C. Jennison Estate, seedling Blueberries, $2.
C. W. Brown, Raspberries and Strawberries, $1.
E. S. Martin, basket of fruit, $1.

Dahlia and Fruit Exhibition.

September 11 and 12.

Theodore Lyman Fund No. 1.

Apples.— For the best collection of six varieties of fall apples, specimens to be ripe and twelve of each:
1st, A. B. Howard & Son, $10; 2d, M. S. Wheeler, $8.

Benjamin V. French Fund No. 1.

Peaches.— For the largest and best collection of native peaches:
1st, H. A. Clark, $10; 2d, G. V. Fletcher, $6.

Marshall P. Wilder Fund.

Pears.— Bartlett:
1st, Mrs. Elbridge Torrey, $3; 2d, F. W. Dahl, $2; 3d, G. V. Fletcher, $1.
Clapp's Favorite:
1st, A. F. Estabrook, $3; 2d, G. V. Fletcher, $2; 3d, A. B. Howard & Son, $1.
Any other variety:
1st, W. C. Winter, $3; 2d, F. W. Dahl, $2; 3d, W. Heustis & Son, $1.

Society's Prizes.

Apples.— Gravenstein:
1st, A. W. Fletcher, $3; 2d, C. S. Smith, $2; 3d, M. S. Wheeler, $1.
Maiden Blush:
1st, E. E. Cole, $3; 2d, A. F. Estabrook, $2; 3d, W. C. Winter, $1.
Porter:
1st, C. S. Smith, $3; 2d, G. W. Page, $2; 3d, George Page, $1.
Wealthy:
2d, E. E. Cole, $2.
Any other variety:
1st, E. E. Cole, $3; 2d, M. S. Wheeler, $2; 3d, A. W. Fletcher, $1.
Peaches.— Belle of Georgia:
1st, H. A. Clark, $3.

Carman:
1st, A. F. Estabrook, $3.
Champion:
1st, G. V. Fletcher, $3; 2d, H. A. Clark, $2; 3d, G. F. Wheeler, $1.
Elberta:
1st, C. S. Smith, $3; 2d, W. Heustis & Son, $2; 3d, J. S. Chase, $1.
Oldmixon:
1st, H. A. Clark, $3; 2d, M. S. Wheeler, $2; 3d, G. V. Fletcher, $1.
Any other variety:
1st, C. S. Smith, Mountain Rose, $3; 2d, H. A. Clark, Heiley, $2; 3d, G. V. Fletcher, Foster, $1.

PLUMS.— Collection of not less than four varieties other than Japanese, twelve specimens of each:
1st, A. B. Howard & Son, $5; 2d, G. V. Fletcher, $3.
Single plate of any variety other than Japanese:
1st, T. D. Hatfield, Kirk's Seedling, $3; 2d, H. A. Clark, Bradshaw, $2; 3d, G. V. Fletcher, Bradshaw, $1.

JAPANESE PLUMS.— Collection of not less than four varieties, twelve specimens of each:
1st, M. S. Wheeler, $5.
Single plate of any variety:
1st, M. S. Wheeler, Sultan, $3; 2d, E. A. Adams, Chabot, $2; 3d, W. C. Winter, Hale, $1.

Theodore Lyman Fund No. 2.

NATIVE GRAPES.— Green Mountain, six bunches:
1st, E. R. Farrar, $3; 2d, J. S. Chase, $2; 3d, Dr. W. G. Kendall, $1.
Any other white grape, six bunches:
1st, E. R. Farrar, Niagara, $3; 2d, John Bauernfeind, Niagara, $2; 3d, W. C. Winter, Lady, $1.
Moore's Early, six bunches:
1st, E. R. Farrar, $3; 2d, G. V. Fletcher, $2.
Any other purple grape, six bunches:
1st, E. R. Farrar, Worden, $3; 2d, John Bauernfeind, Worden, $2.
Any red grape, six bunches:
1st, John Bauernfeind, Delaware, $3; 2d, E. R. Farrar, Brighton, $2.
Collection of five varieties, three bunches of each:
1st, E. R. Farrar, $5; 2d, John Bauernfeind, $4.

Society's Prizes.

COLLECTION OF SEASONABLE FRUIT, arranged for effect with foliage, to cover a space not larger than twenty-four sq. ft.:
1st, H. A. Clark, $15; 2d, F. W. Dahl, $12; 3d, M. S. Wheeler, $10.

Gratuities:—

W. C. Winter, Erie Blackberries, $1.
Miss Cornelia Warren, Figs, $1.
D. T. Henry, " $1.
Jennison's Floral Gardens, Ideal Everbearing Strawberry, $1.
Mrs. R. Goodnough, basket of fruit, $2.

October Show.

October 2 and 3.

Theodore Lyman Fund No. 2.

Apples.— Collection of six varieties of fall apples, ripe, twelve of each:
1st, Derby Farm, $12; 2d, Elliott & H. W. Moore, $10; 3d, C. S. Minot, $8.

Samuel Appleton Fund.

Apples.— Baldwin:
1st, Derby Farm, $3; 2d, M. S. Wheeler, $2; 3d, D. R. Craig, $1.
Hubbardston:
1st, Charles Scully, $3; 2d, Elliott & H. W. Moore, $2; 3d, D. R. Craig, $1.

Benjamin V. French Fund No. 2.

Apples.— Gravenstein:
1st, C. S. Smith, $3; 2d, Derby Farm, $2; 3d, Elliott & H. W. Moore, $1.
King:
1st, Elliott & H. W. Moore, $3; 2d, E. E. Cole, $2; 3d, M. J. Cain, $1.
McIntosh:
1st, Derby Farm, $3; 2d, Elliott & H. W. Moore, $2; 3d, E. E. Cole, $1.
For the best six varieties of winter apples, twelve specimens of each:
1st, Derby Farm, $10; 2d, M. S. Wheeler, $8; 3d, Elliott & H. Ward Moore, $6.

Society's Prizes.

Apples.— Bellflower:
1st, Elliott & H. W. Moore, $3; 2d, D. R. Craig, $2; 3d, C. S. Smith, $1.

Fall Pippin:
2d, E. E. Cole, $2.
Fameuse:
1st, Elliott & H. W. Moore, $3; 2d, Mrs. Timothy McDermott, $2; 3d, E. E. Cole, $1.
Golden Russet:
1st, E. E. Cole, $3.
Jonathan:
1st, Derby Farm, $3.
Maiden Blush:
1st, E. E. Cole, $3; 2d, T. L. Perkins, $2.
Northern Spy:
2d, E. E. Cole, $2.
Pound Sweet:
1st, G. V. Fletcher, $3.
Rhode Island Greening:
1st, Derby Farm, $3; 2d, M. S. Wheeler, $2; 3d, Elliott & H. W. Moore, $1.
Roxbury Russet:
1st, Derby Farm, $3; 2d, M. S. Wheeler, $2; 3d, Mrs. Timothy McDermott, $1.
Sutton:
1st, M. S. Wheeler, $3; 2d, Elliott & H. W. Moore, $2; 3d, Joseph Howland, $1.
Tolman Sweet:
1st, G. V. Fletcher, $3.
Winter Banana:
3d, M. J. Cain, $1.
York Imperial:
1st, A. B. Howard & Son, $3; 2d, M. S. Wheeler, $2.
Any other variety, ripe:
1st, E. R. Farrar, Wealthy, $3; 2d, E. E. Cole, Chenango, $2; 3d, Elliott & H. W. Moore, Washington Strawberry, $1.
Any other variety, not ripe:
1st, Derby Farm, Blue Pearmain, $3; 2d, Joseph Howland, N. Y. Pippin, $2; 3d, Elliott & H. W. Moore, Spitzenburgh, $1.

John S. Farlow Newton Horticultural Society Fund.

Pears.— Angouleme:
1st, F. W. Dahl, $3; 2d, Mrs. Elbridge Torrey, $2; 3d, J. L. Bird, $1.
Anjou:
1st, F. W. Dahl, $3; 2d, A. F. Estabrook, $2; 3d, H. A. Lamb, $1.
Bosc:
1st, Mrs. N. F. Winnele, $3; 2d, W. Heustis & Son, $2; 3d, M. J. Cain, $1.

Clairgeau:
1st, F. W. Dahl, $3; 2d, A. B. Howard & Son, $2; 3d, E. L. Smith, $1.
Lawrence:
1st, F. W. Dahl, $3; 2d, A. B. Howard & Son, $2; 3d, Elliott & H. W. Moore, $1.
Louise Bonne de Jersey:
1st, Charles Scully, $3; 2d, F. W. Dahl, $2; 3d, A. B. Howard & Son, $1.
Marie Louise:
1st, Mrs. Elbridge Torrey, $3.
Onondaga:
1st, H. A. Lamb, $3.
Seckel:
1st, Mrs. N. F. Winnele, $3; 2d, A. F. Estabrook, $2; 3d, F. W. Dahl, $1.
Sheldon:
1st, A. F. Estabrook, $3; 2d, F. W. Dahl, $2; 3d, Mrs. Elbridge Torrey, $1.
Superfin:
1st, F. W. Dahl, $3.
Urbaniste:
1st, F. W. Dahl, $3.
Vicar:
1st, F. W. Dahl, $3; 2d, H. A. Lamb, $2; 3d, A. B. Howard & Son, $1.
Any other variety:
1st, Elliott & H. W. Moore, Bartlett, $3; 2d, G. V. Fletcher, Bartlett, $2; 3d, A. B. Howard & Son, Boussock, $1.
Collection of pears, not more than twelve plates of twelve specimens each and not less than six varieties:
1st, F. W. Dahl, $10.

Society's Prizes.

NATIVE GRAPES.— Agawam, six bunches:
1st, John Bauernfeind, $3; 2d, E. S. Martin, $2; 3d, E. R. Farrar, $1.
Brighton:
1st, John Bauernfeind, $3; 2d, C. W. Libby, $2; 3d, E. S. Martin, $1.
Campbell's Early:
1st, John Bauernfeind, $3; 2d, E. L. Lewis, $2.
Concord:
1st, E. R. Farrar, $3; 2d, John Bauernfeind, $2; 3d, Dr. W. G. Kendall, $1.
Delaware:
1st, C. W. Libby, $3; 2d, Dr. W. G. Kendall, $2; 3d, E. S. Martin, $1.
Eaton:
2d, E. S. Martin, $2.

Green Mountain:
1st, Dr. W. G. Kendall, $3; 2d, E. R. Farrar, $2.
Herbert:
1st, John Bauernfeind, $3; 2d, C. W. Libby, $2.
Lindley:
1st, C. W. Libby, $3; 2d, E. S. Martin, $2; 3d, J. S. Chase, $1.
Moore's Diamond:
1st, C. W. Libby, $3; 2d, John Bauernfeind, $2; 3d, Dr. W. G. Kendall, $1.
Niagara:
1st, John Bauernfeind, $3; 2d, E. R. Farrar, $2; 3d, Dr. W. G. Kendall, $1.
Prentiss:
2d, J. S. Chase, $2.
Salem:
1st, Dr. W. G. Kendall, $3; 2d, John Bauernfeind, $2.
Vergennes:
1st, Dr. W. G. Kendall, $3; 2d, E. S. Martin, $2; 3d, J. S. Chase, $1.
Wilder:
2d, J. S. Chase, $2.
Worden:
1st, E. R. Farrar, $3; 2d, John Bauernfeind, $2; 3d, Dr. W. G. Kendall, $1.
Any other variety:
1st, John Bauernfeind, Goff, $3; 2d, John Bauernfeind, Diana, $2; 3d, J. W. Stone, August Rose, $1.
Collection of hardy native grapes, not less than six varieties of three bunches each:
1st, John Bauernfeind, $10; 2d, E. R. Farrar, $8; 3d, C. W. Libby, $1.

PEACHES.— Champion:
1st, G. V. Fletcher, $3.
Any other variety:
1st, A. F. Estabrook, Lord Palmeston, $3; 2d, G. V. Fletcher, Elberta, $2; 3d, C. S. Smith, Elberta, $1.

PLUMS.— Any variety:
1st, Oliver Ames, Satsuma, $3; 2d, M. S. Wheeler, Wickson, $2; 3d, M. J. Cain, Yellow Egg, $1.

QUINCES.— Any variety:
1st, G. V. Fletcher, Orange, $3; 2d, D. R. Craig, Orange, $2.

NATIVE NUTS.— Collection of not less than four varieties, one quart of each:
1st, M. S. Wheeler, $4; 2d, Mrs. F. C. Upham, $3.

COLLECTION OF NATIVE AND FOREIGN FRUITS, arranged for effect:
1st, Mrs. R. Goodnough, $15; 2d, F. W. Dahl, $12.

Gratuities:—

G. V. Fletcher, collection of Peaches, $5.
H. A. Clark, " " " $3.
Jennison's Floral Gardens, Ideal Strawberry, $1.

Autumn Exhibition of Plants, Flowers, Fruits, and Vegetables.

November 4, 5, 6, and 7.

Samuel Appleton Fund.

Apples.— Baldwin:
1st, Derby Farm, $3; 2d, E. M. Bruce, $2; 3d, J. M. Schwartz, $1.
Hubbardston:
1st, Derby Farm, $3; 2d, J. M. Schwartz, $2; 3d, Elliott & H. W. Moore, $1.

Benjamin V. French Fund No. 1.

Apples.— Rhode Island Greening:
1st, Derby Farm, $3; 2d, D. R. Craig, $2; 3d, Elliott & H. W. Moore, $1.

Society's Prizes.

Apples.— Bellflower:
1st, W. C. Swain, $3; 2d, W. H. Stone, $2; 3d, Elliott & H. W. Moore, $1.
McIntosh:
1st, Derby Farm, $3; 2d, Elliott & H. W. Moore, $2; 3d, E. E. Cole, $1.
Northern Spy:
1st, E. R. Farrar, $3; 2d, M. B. Farrar, $2; 3d, H. C. Fuller, $1.
Palmer Greening:
1st, Derby Farm, $3; 2d, E. F. Adams, $2; 3d, H. C. Fuller, $1.
Pound Sweet:
1st, J. H. Fletcher, $3; 2d, A. H. Prouty, $2; 3d, G. V. Fletcher, $1.
Roxbury Russet:
1st, H. C. Fuller, $3; 2d, Derby Farm, $2; 3d, J. M. Schwartz, $1.
Sutton:
1st, E. M. Bruce, $3; 2d, Elliott & H. W. Moore, $2.
Tolman Sweet:
1st, E. R. Farrar, $3; 3d, G. V. Fletcher, $1.

Tompkins County King:
1st, Elliott & H. W. Moore, $3; 2d, M. J. Cain, $2; 3d, E. E. Cole, $1.
Winter Banana:
1st, M. J. Cain, $3.
Any other variety:
1st, E. E. Cole, Fall Pippin, $3; 2d, J. M. Schwartz, Porter, $2; 3d, E. R. Farrar, Canada Red, $1.
For the best six varieties of winter apples, twelve specimens of each:
1st, Derby Farm, $12; 2d, Elliott & H. W. Moore, $10; 3d, H. C. Fuller, $8.
Collection of apples arranged for decorative effect:
1st, Derby Farm, $20; 2d, E. M. Bruce, $15.
For the largest and best exhibit of apples, not less than ten varieties, five specimens of each:
1st, Derby Farm, $15; 2d, Elliott & H. W. Moore, $12.
For the best exhibit of apples in trays, not less than five trays and one or more varieties:
1st, H. C. Fuller, $25; 2d, Derby Farm, $15; 3d, Parker Bros., $10.

CRABAPPLES.— Twenty-four specimens, any variety:
1st, J. W. Keeffe, $3; 2d, J. M. Schwartz, $2.

NATIVE GRAPES.— Collection of hardy native grapes, not less than three varieties, three bunches of each:
1st, John Bauernfeind, $10; 2d, C. W. Libby, $8; 3d, Dr. W. G. Kendall, $6.

QUINCES.— Any variety, twelve specimens:
2d, G. V. Fletcher, $2; 3d, J. M. Schwartz, $1.

CRANBERRIES.— Collection of not less than three varieties, half-peck of each:
1st, L. J. Fosdick, $10.
Half-peck of any variety:
1st, L. J. Fosdick, McFarlin, $5.

COLLECTION OF NATIVE AND FOREIGN FRUIT, arranged for effect:
1st, Mrs. R. Goodnough, $15; 2d, F. W. Dahl, $12.

John S. Farlow Newton Horticultural Society Fund.

PEARS.— Angouleme:
1st, F. W. Dahl, $3; 2d, Mrs. Elbridge Torrey, $2.
Anjou:
1st, F. W. Dahl, $3;
Dana's Hovey:
1st, W. Heustis & Son, $3.
Lawrence:
1st, F. W. Dahl, $3; 2d, Elliott & H. W. Moore, $2.

Seckel:
1st, F. W. Dahl, $3.
Vicar:
1st, F. W. Dahl, $3; 2d, E. B. Wilder, $2.
Any other variety:
1st, F. W. Dahl, Urbaniste, $3; 2d, W. Heustis & Son, Clairgeau, $2; 3d, F. W. Dahl, Clairgeau, $1.
Collection of six varieties of winter pears, twelve specimens of each:
1st, F. W. Dahl, $10.

Samuel Appleton Fund.

PEARS.— Bosc:
1st, G. V. Fletcher, $3; 2d, W. Heustis & Son, $2; 3d, H. A. Clark, $1.
Sheldon:
2d, F. W. Dahl, $2.

Gratuity:—

E. S. Martin, Satsuma Plums, $1.

REPORT OF THE COMMITTEE ON VEGETABLES FOR THE YEAR 1915.

By Duncan Finlayson, Chairman.

The Committee on Vegetables has been greatly pleased and encouraged the past season by the renewal of interest that has been shown in the vegetable department by the general public, as well as by the care shown in the selection and sorting of the various exhibits, and the skill with which the growers have put their produce before the public.

The past season was very favorable for the growing of vegetables owing to the abundance of rain and moisture during the growing period. Competition has been very close in most cases, showing that a high standard in vegetable culture is demanded. We note with pleasure that several new exhibitors have been added to the already long list of the previous year.

There were eleven exhibitions of vegetables during the year, all of which were unusually well attended. At the exhibition of February 6, Frank Wheeler of Concord showed very fine asparagus. The Spring Exhibition, March 18 to 21, was well attended. Some fine exhibits of vegetables were shown, especially the mushrooms from A. W. Crockford of Medford.

May 15, the collection of vegetables from Faulkner Farm was very remarkable, both for the quality of the vegetables and for the splendid way in which the exhibit was staged.

June 5 and 6, the cauliflowers from F. W. Sargent of Wellesley and the Faulkner Farm of Brookline, were of unusual merit.

June 12 and 13, Norris F. Comley of Lexington exhibited his new tomato, Buck's Trisco, for which Honorable Mention was awarded.

On June 19 and 20 the displays were both large and of excellent quality. The peas from W. J. Clemson of Taunton and from F. W. Sargent of Wellesley were of superior quality. The collection of vegetables shown by W. J. Clemson was of unusual merit.

The exhibition of July 10 and 11 brought out some keen competition. The potatoes and tomatoes were of remarkably good quality.

August 7 and 8, all the classes were well competed for. Splendid corn and onions were shown.

At the exhibition of September 11–12, prizes were offered for a collection of tomatoes, and for a collection of vegetables of not less than ten varieties. The first prize for the former was awarded to F. W. Sargent of Wellesley for splendid specimens, and the first for the latter to David L. Fiske of Grafton.

October 2–3. This was the main show of vegetables for the year. Sixty-one classes were competed for and all had the keenest competition. The quality of the vegetables was unusually fine, and the collections were very skilfully arranged. The prize of $20 from the Levi Whitcomb Fund for the best seedling potato grown for at least two years in New England was not awarded. None of the varieties shown came up to the standard of the older varieties.

The Silver Medals offered for the best new vegetable shown in 1915 and the best improved vegetable shown in 1915 were not awarded, owing to the inferiority of the specimens shown as compared with the older varieties. Class No. 612, for the best display of vegetables put up in glass jars, brought out good competition. The first prize was awarded to Miss Hermine Schulz, 335 Cornell St., Roslindale. The following is a list of the fifty-one kinds shown:

Dandelion Greens
Spinach "
Milkweed "
Beet "
Sugar Beet "
Borage "
Lettuce
Curled Kale
Swiss Chard
Asparagus
Pickled Radishes
Rhubarb
Watermelon Rind
Beets
Kohl-Rabi
Beans
Carrots
Turnips
Onions
Peas
Corn
Shelled Beans
Succotash
Squash
Swiss Chard Stems
Tomatoes
Parsnips
Egg-Plant

Cauliflower
Sweet Potato
Sauer Kraut
Spiced Cabbage
Stuffed Peppers
Pickled Beets
Red Cabbage
Pickled Horse Radish and Beets
" " " " Apples
Cucumber Relish
Strawberries
Cherries
Pineapples
Gooseberries
Raspberries
Blackberries
Plums
Apples
Rum Cherries
Pears
Peaches
Lazzarolli Apples
Grapes

In all she put up 256 pints.

In class No. 702, Collection of vegetables shown by seedsmen, exempt from Rule 9, the Silver Medal was awarded to the Thomas J. Grey Company. We believe this was the largest collection of vegetables ever gotten together by one exhibitor in this country. It was beautifully arranged and correctly labeled, and was a very educational exhibit. There were forty-seven kinds of vegetables and two hundred and thirty-seven varieties. The following is a list of the varieties shown:

ARTICHOKE.— Jerusalem, French Globe.

ASPARAGUS.— Forced.

BEANS.— Refugee Green, Sure Crop Stringless, French's Horticultural, Burpee's Bush Lima.

BEET.— Detroit Dark Red, Early Crosby, Dewing's Blood Turnip, Grey's Perfection, Edmands Blood Turnip.

BEET MANGEL WURZEL.— Mammoth Long Red, Studstrup, Yellow Windsor.

BROCCOLI.— White Cape.

BRUSSELS SPROUTS.— Dobbie's Exhibition, Long Island Improved, Aigburth.

CABBAGE.— Globe Savoy, Mammoth Red Rock, Red Dutch, Copenhagen Market, Stone Mason, Chinese, Fottler's Brunswick, Danish Ballhead, Succession, Hollander.

CARROT.— Long Orange, Guerande, White Belgium, Imp. Short White, Danvers Hutchin's strain, Scarlet Horn, Chantenay, Danvers Half Long, Intermediate.

CAULIFLOWER.— Early Snowball, Dwarf Erfurt, Veitch's Autumn Giant.

CELERIAC.— Turnip Rooted.

CELERY.— Paris Golden, New Rose, Giant Pascal, Giant Crimson.

CHICORY.— Large Rooted.

CORN, SWEET.— Stowell's.

CORN, FIELD.— Canadian Cap, Leaming, Stickney.

CRESS.— Water.

CUCUMBER.— White Wonder, Private Forcing Strain.

DANDELION.— Thick Leaf.

EGG PLANT.— Black Beauty, Improved Long Island.

ENDIVE.— Broad Leaved Batavian, Green Curled.

FENNEL.— Florence.

GOURDS.— Ornamental, 15 varieties.

HERBS.— 10 varieties.

KALE.— Russian, Welsh, German, Dwarf Green, Tall Green, Purple.

KOHL RABI.— Purple Vienna, White Vienna.

LEEKS.— Dobbie's Champion, Musselburgh, Large Flag, Large Rouen.

LETTUCE.— May King, Hittinger's Belmont, Big Boston, Sutton's Gem Cos, Wonderful.

MELON.— Colorado Preserving, White Citron, Green Citron.

MUSHROOM.— Pure Culture.

MUSTARD.— Chinese, White, Fordhook Fancy.

OKRA.— Dwarf Green.

ONION.— Giant Gibraltar, Ailsa Craig, Cranston's Excelsior, Southport Red Globe, Southport White Globe, Danvers True Type, Danvers Market Garden Strain, Yellow Globe Danvers, White Wonder, Crimson Globe, White Pickling.

PARSLEY.— Grey's Perfection, Moss Curled, Double Curled, Fern Leaved.

PARSNIP.— Hollow Crown, Arlington Long White, Early Round, Student, Long Smooth.

PEAS.— Alaska.

PEPPERS.— Chili, Golden Dawn, Bull Nose, Long Red Cayenne, Ruby King, Squash, Sweet Mountain, Neapolitan.

POTATOES.— Early Ohio, Bliss' Triumph, Delaware, New Queen, Beauty of Hebron, Early Rose, Eureka, Irish Cobbler, Knowles' Big Cropper, Green Mountain, Carmen #3, Early White Albino, Norcross, Early Norther, Gold Coin, Uncle Sam, White Rose, Bovee, Averill's Early Rose.

POTATOES, SWEET.— Long Island Grown, Buzzards Bay Grown, Graziana's Golden.

PUMPKIN.— Large Tours, Mammoth Yellow, Sweet Japanese Pie, Cheese, Small Sugar.

RADISH.— Round Black Spanish, Giant Stuttgart, Early Scarlet Globe.

SALSIFY.— Mammoth Sandwich Island, Long White French.

SPINACH.— Savoy, New Zealand.

SQUASH.— Boston Marrow, White Scallop, Summer Crookneck, Blue Hubbard, Warted Hubbard, Shurtleff's Hybrid, Mammoth Chili, Italian Marrow, Mammoth Golden, Hubbard, Delicious True Type, Delicious Improved, English Marrow White Cream, English Marrow Long Yellow.

SWISS CHARD.—

TOMATOES.— Peach Red, Peach Yellow, Fig or Pear Red, Fig or Pear Yellow, Cherry Red, Cherry Yellow, Plum Red, Plum Yellow, Currant or Grape, Strawberry, Golden Queen, Crimson Cushion, Livingston's Beauty, Stirling Castle, Lister's Prolific, Livingston's Globe, Bonny Best, Ponderosa, June Pink, Comet, Livingston's Stone, Sunrise, Matchless, Victoria, Best of All, Crockford's Alaska, Essex Marvel, Champion.

TURNIP.— Purple Top Globe, Early Milan, Snowball.

TURNIP, RUTA BAGA.— Aberdeen, Imp. American, Imperial Swede, Shamrock.

Albert Watson of Durham, New Hampshire, showed sixty-three different seedling potatoes. We hope some of them will make a good showing another year. Dr. F. S. De Lue showed seedling sweet corn, an improved Golden Bantam, for which Honorable Mention was awarded. James S. Bache also exhibited new sweet corn named Golden Eagle; a Vote of Thanks was awarded for this variety. The Boston Market Gardeners' Association put up some splendid exhibits of vegetables during the year. Much credit is due this Association for their effort in placing their produce before the public in an up-to-date style.

When we consider that Massachusetts stands at the head of all the states in the Union in the amount of production of vegetables per acre, also that the best quality of vegetables are grown in Massachusetts; when the vegetable products of the state equal more in value than the fruits, plants, and flowers combined, your committee believes that the Society should do far more than it has done to encourage the farmer, private and amateur grower to exhibit at the Society's exhibitions. Your committee believes that it is a poor policy for the Society to reduce the money appropriation for vegetables to a minimum.

A detailed list of awards made during the year is appended to this report.

DUNCAN FINLAYSON
WILLIAM N. CRAIG
RICHARD HITTINGER
HENRY M. HOWARD
JOHN L. SMITH
Committee on Vegetables.

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1915.

FEBRUARY 6 AND 7.

ASPARAGUS.— Forced, twelve stalks:
1st, Frank Wheeler, $3; 2, Frank Wheeler, $2.

LETTUCE.— Four heads:
1st, Shaw Estate, $3; 2d, Hittinger Fruit Co., $2; 3d, Mrs. Frederick Ayer, $1.

MUSHROOMS.— Twelve specimens:
1st, A. W. Crockford, $3.

PARSLEY.— Two quarts:
1st, Mrs. Frederick Ayer, $3; 2d, William Whitman, $2; 3d, A. W. Preston, $1.

RADISHES.— Four bunches:
1st, H. M. Howard, $3; 2d, J. W. Stone, $2; 3d, A. W. Crockford, $1,

RHUBARB.— Twelve stalks:
1st, Frank Wheeler, $3.

TOMATOES.— Twelve specimens:
1st, A. W. Crockford, $3; 2d, Mrs. Frederick Ayer, $2; 3d, Mrs. Frederick Ayer, $1.

Gratuities:—

F. W. Sargent, collection of vegetables, $2.
Boston Market Gardeners' Association, collection of vegetables, $25.

SPRING EXHIBITION.

MARCH 18, 19, 20 AND 21.

BEANS.— String, fifty pods:
1st, Ernest Townsend, $3.
BEETS.— New, six specimens:
1st, H. M. Howard, $3.
CUCUMBERS.— Four
1st, J. W. Stone, $3; 2d, Frank Wheeler, $2; 3d, Boston Gardening Co., $1.
LETTUCE.— Four heads:
1st, R. B. Horne, $3; 2d, Hittinger Fruit Co., $2; 3d, J. W. Skehan, $1.
Hittinger's:
1st, Mrs. Frederick Ayer, $3; 2d, Wyman Bros., $2; 3d, M. E. Moore, $1.
MUSHROOMS.— Twelve specimens:
1st, A. W. Crockford, $3; 3d, B. F. Thomas, $1.
RADISHES.— Four bunches:
1st, J. W. Stone, $3; 2d, A. W. Crockford, $2.
RHUBARB.— Twelve stalks:
1st, Frank Wheeler, $3.
TOMATOES.— Twelve specimens:
1st, A. W. Crockford, $3; 2d, Ernest Townsend, $2.
COLLECTION OF FORCED VEGETABLES.— Eight varieties:
1st, Ernest Townsend, $12; 2d, H. M. Howard, $8.

Gratuities:—

F. W. Sargent, collection of vegetables, $3.
Boston Market Gardeners' Association, collection of vegetables in boxes, $25.

May Exhibition.

May 15 and 16.

Theodore Lyman Fund No. 2.

Asparagus.— Four bunches, twelve stalks each:
1st, Frank Wheeler, $5; 2d, Wilfrid Wheeler, $3; 3d, W. J. Clemson, $2.

Beans.— String variety, forced, one quart:
1st, Mrs. Frederick Ayer, $4; 2d, Mrs. Frederick Ayer, $2.

Beets.— Twelve specimens, open culture:
1st, W. J. Clemson, $3.

Lettuce.— Four heads, Tennisball:
1st, Oliver Ames, $3; 2d, W. J. Clemson, $2.

Any other variety:
1st, M. E. Moore, $3; 2d, Mrs. Frederick Ayer, $2.

Radishes.— Four bunches:
1st, J. W. Stone, $3; 2d, F. W. Sargent, $2; 3d, Oliver Ames, $1.

Spinach.— Two pecks:
1st, W. J. Clemson, $3.

Tomatoes.— Twelve specimens:
1st, Faulkner Farm, $3; 2d, Mrs. Frederick Ayer, $2; 3d, A. W. Preston, $1.

Collection of Vegetables.— Grown in 1915, six varieties, decorative arrangement to be considered:
1st, Faulkner Farm, $8; 2d, W. J. Clemson, $5; 3d, F. W. Sargent, $3.

Rhubarb.— Twelve stalks:
1st, Oliver Ames, $2; 2d, Mrs. Frederick Ayer, $1; 3d, W. J. Clemson, $1.

Gratuity:—

Faulkner Farm, collection of vegetables, $2.

June Exhibition.

June 5 and 6.

Theodore Lyman Fund No. 2.

Asparagus.— Four bunches, twelve stalks each:
1st, Frank Wheeler, $5.

Beans.— String variety, forced, one quart:
1st, Mrs. Frederick Ayer, $3; 2d, Mrs. Frederick Ayer, $2.

BEETS.— Twelve specimens:
1st, Wyman Bros., $3; 2d, Mrs. A. A. Warburton, $2; 3d, F. W. Sargent, $1.
CABBAGES.— Four specimens:
1st, Faulkner Farm, $4; 2d, F. W. Sargent, $3.
CARROTS.— Four bunches:
1st, W. Heustis & Son, $3; 2d, F. W. Sargent, $2.
CAULIFLOWERS.— Four specimens:
1st, Faulkner Farm, $4; 2d, F. W. Sargent, $3.
CUCUMBERS.— Four:
1st, Hittinger Fruit Co., $3; 2d, M. E. Moore, $2; 3d, Lovell Bros., $1.
LETTUCE.— Four heads:
1st, J. W. Stone, $3; 2d, Lovell Bros., $2; 3d, W. Heustis & Son, $1.
RADISHES.— Four bunches:
1st, J. W. Stone, $3; 2d, Lovell Bros., $2; 3d, W. Heustis & Son, $1.
TOMATOES.— Twelve specimens:
1st, Faulkner Farm, $3; 2d, Faulkner Farm, $2.

Gratuities:—

M. E. Moore, Spinach, $1.
W. Heustis & Son, Turnips, $1.
F. W. Sargent, Onions, $1.
Frank Wheeler, Rhubarb, $1.
Wyman Bros., Endive, $1.
" " Romaine Lettuce, $1.
Miss Elizabeth Thatcher, collection of vegetables, $1.
Boston Market Gardeners' Association, collection of vegetables in boxes, $30.

PEONY EXHIBITION.

JUNE 12 AND 13.

N. F. Comley, new Tomato Buck's Trisco, Honorable Mention.
Miss Elizabeth Thatcher, Joseph Madden, gardener, Mushrooms and Lettuce, Vote of Thanks.

Rose and Strawberry Exhibition.

June 19 and 20.

Theodore Lyman Fund No. 2.

Beans.— String:
3d, Mrs. Frederick Ayer, $1.
Beets.— Twelve, open culture:
1st, E. L. Lewis, $3; 2d, W. J. Clemson, $2; 3d, M. E. Moore, $1.
Cabbages.— Four specimens:
1st, W. Heustis & Son, $3; 2d, F. W. Sargent, $2; 3d, M. E. Moore, $1.
Cauliflowers.— Four specimens:
1st, F. W. Sargent, $4.
Cucumbers.— Four specimens:
1st, M. E. Moore, $3; 2d, J. W. Stone, $2.
Lettuce.— Four heads:
1st, W. J. Clemson, $4; 2d, Miss Elizabeth Thatcher, $3; 3d, E. L. Lewis, $2; 4th, W. J. Clemson, $1.
Peas.— Gradus or Thomas Laxton, fifty pods:
1st, W. J. Clemson, $3; 2d, Mrs. A. A. Warburton, $2; 3d, F. W. Sargent, $1.
Sutton's Excelsior, fifty pods:
1st, E. L. Lewis, $3; 2d, Mrs. A. A. Warburton, $2; 3d, F. W. Sargent, $1.
Any other variety, fifty pods:
1st, E. L. Lewis, $3; 2d, F. W. Sargent, $2; 3d, W. J. Clemson, $1.
Collection of four varieties, fifty pods each:
1st, F. W. Sargent, $4; 2d, Mrs. A. A. Warburton, $3.
Collection of Vegetables.— Ten varieties, tastefully arranged:
1st, W. J. Clemson, $10; 2d, W. Heustis & Son, $8.

Gratuities:—

Frank Wheeler, Asparagus and Rhubarb, $3.
Boston Market Gardeners' Association, collection of vegetables in boxes, $15.

Sweet Pea Exhibition.

July 10 and 11.

William J. Walker Fund.

Beans.— String, two quarts:
1st, W. J. Clemson, $3; 2d, J. W. Stone, $2; 3d, W. J. Clemson, $1.

BEETS.— Twelve:
1st, E. L. Lewis, $3; 2d, W. Heustis & Son, $2; 3d, W. J. Clemson, $1.
CABBAGES.— Four specimens:
1st, W. Heustis & Son, $4; 2d, W. Heustis & Son, $3.
CARROTS.— Six specimens:
1st, E. L. Lewis, $3; 2d, E. L. Lewis, $2; 3d, D. L. Fiske, $1.
CUCUMBERS.— Four:
1st, J. W. Stone, $3; 2d, Mrs. Frederick Ayer, $2.
LETTUCE.— Four heads:
1st, E. L. Lewis, $3; 2d, W. J. Clemson, $2; 3d, E. L. Lewis, $1.
PEAS.— Fifty pods:
1st, D. C. Kerr, $3; 2d, Charles Scully, $2; 3d, F. W. Sargent, $1.
POTATOES.— Twelve specimens:
1st, Oliver Ames, $3; 2d, Charles Scully, $2; 3d, Charles Scully, $1.
TOMATOES.— Twelve specimens:
1st, Oliver Ames, $3; 2d, W. J. Clemson, $2; 3d, Oliver Ames, $1.
COLLECTION OF VEGETABLES.— Twelve varieties, tastefully arranged:
1st, W. J. Clemson, $15; 2d, D. L. Fiske, $10.

Gratuities:—

W. Heustis & Son, Squash, $1.
Oliver Ames, Onions, $1.
F. W. Sargent, Bull Nose Peppers, $1.
" " " Collection of Peas, $3.
Mrs. A. A. Warburton, " " " $1.
E. L. Lewis, collection of vegetables, $2.
Hermine A. Schulz, " " " $2.

GLADIOLUS AND PHLOX EXHIBITION.

AUGUST 7 AND 8.

BEANS.— Two quarts, shelled:
1st, D. L. Fiske, $3; 2d, John Bauernfeind, $2.
String, four quarts:
1st, Oliver Ames, $3; 2d, D. R. Craig, $2; 3d, F. W. Sargent, $1.
CUCUMBERS.— White Spine variety:
1st, Hittinger Fruit Co., $3; 2d, Mrs. A. A. Warburton, $2; 3d, Oliver Ames, $1.
CABBAGES.— Four specimens:
1st, W. Heustis & Son, $3; 2d, Mrs. N. P. Cutler, $2.
CAULIFLOWERS.— Four specimens:
3d, F. W. Sargent, $2.

Rose and Strawberry Exhibition.

June 19 and 20.

Theodore Lyman Fund No. 2.

Beans.— String:
3d, Mrs. Frederick Ayer, $1.
Beets.— Twelve, open culture:
1st, E. L. Lewis, $3; 2d, W. J. Clemson, $2; 3d, M. E. Moore, $1.
Cabbages.— Four specimens:
1st, W. Heustis & Son, $3; 2d, F. W. Sargent, $2; 3d, M. E. Moore, $1.
Cauliflowers.— Four specimens:
1st, F. W. Sargent, $4.
Cucumbers.— Four specimens:
1st, M. E. Moore, $3; 2d, J. W. Stone, $2.
Lettuce.— Four heads:
1st, W. J. Clemson, $4; 2d, Miss Elisabeth Thatcher, $3; 3d, E. L. Lewis, $2; 4th, W. J. Clemson, $1.
Peas.— Gradus or Thomas Laxton, fifty pods:
1st, W. J. Clemson, $3; 2d, Mrs. A. A. Warburton, $2; 3d, F. W. Sargent, $1.
Sutton's Excelsior, fifty pods:
1st, E. L. Lewis, $3; 2d, Mrs. A. A. Warburton, $2; 3d, F. W. Sargent, $1.
Any other variety, fifty pods:
1st, E. L. Lewis, $3; 2d, F. W. Sargent, $2; 3d, W. J. Clemson, $1.
Collection of four varieties, fifty pods each:
1st, F. W. Sargent, $4; 2d, Mrs. A. A. Warburton, $3.
Collection of Vegetables.— Ten varieties, tastefully arranged:
1st, W. J. Clemson, $10; 2d, W. Heustis & Son, $8.

Gratuities:—

Frank Wheeler, Asparagus and Rhubarb, $3.
Boston Market Gardeners' Association, collection of vegetables in boxes, $15.

Sweet Pea Exhibition.

July 10 and 11.

William J. Walker Fund.

Beans.— String, two quarts:
1st, W. J. Clemson, $3; 2d, J. W. Stone, $2; 3d, W. J. Clemson, $1.

BEETS.— Twelve:
1st, E. L. Lewis, $3; 2d, W. Heustis & Son, $2; 3d, W. J. Clemson, $1.
CABBAGES.— Four specimens:
1st, W. Heustis & Son, $4; 2d, W. Heustis & Son, $3.
CARROTS.— Six specimens:
1st, E. L. Lewis, $3; 2d, E. L. Lewis, $2; 3d, D. L. Fiske, $1.
CUCUMBERS.— Four:
1st, J. W. Stone, $3; 2d, Mrs. Frederick Ayer, $2.
LETTUCE.— Four heads:
1st, E. L. Lewis, $3; 2d, W. J. Clemson, $2; 3d, E. L. Lewis, $1.
PEAS.— Fifty pods:
1st, D. C. Kerr, $3; 2d, Charles Scully, $2; 3d, F. W. Sargent, $1.
POTATOES.— Twelve specimens:
1st, Oliver Ames, $3; 2d, Charles Scully, $2; 3d, Charles Scully, $1.
TOMATOES.— Twelve specimens:
1st, Oliver Ames, $3; 2d, W. J. Clemson, $2; 3d, Oliver Ames, $1.
COLLECTION OF VEGETABLES.— Twelve varieties, tastefully arranged:
1st, W. J. Clemson, $15; 2d, D. L. Fiske, $10.

Gratuities:—

W. Heustis & Son, Squash, $1.
Oliver Ames, Onions, $1.
F. W. Sargent, Bull Nose Peppers, $1.
" " " Collection of Peas, $3.
Mrs. A. A. Warburton, " " " $1.
E. L. Lewis, collection of vegetables, $2.
Hermine A. Schulz, " " " $2.

GLADIOLUS AND PHLOX EXHIBITION.

AUGUST 7 AND 8.

BEANS.— Two quarts, shelled:
1st, D. L. Fiske, $3; 2d, John Bauernfeind, $2.
String, four quarts:
1st, Oliver Ames, $3; 2d, D. R. Craig, $2; 3d, F. W. Sargent, $1.
CUCUMBERS.— White Spine variety:
1st, Hittinger Fruit Co., $3; 2d, Mrs. A. A. Warburton, $2; 3d, Oliver Ames, $1.
CABBAGES.— Four specimens:
1st, W. Heustis & Son, $3; 2d, Mrs. N. P. Cutler, $2.
CAULIFLOWERS.— Four specimens:
3d, F. W. Sargent, $2.

EGG PLANTS.— Four specimens:
1st, E. L. Lewis, $3.
PEPPERS.— Twelve specimens, any variety:
1st, E. L. Lewis, $3; 2d, E. L. Lewis, $2; 3d, Mrs. A. A. Warburton, $1.
SQUASHES.— Marrow, three specimens:
1st, F. W. Sargent, $3.
SWEET CORN.— Twelve ears, Crosby:
1st, F. W. Sargent, $3; 2d, E. L. Lewis, $2.
Twelve ears, any other variety:
1st, J. W. Stone, $3; 2d, D. L. Fiske, $2; 3d, F. W. Sargent, $1.
ONIONS.— Twelve specimens:
1st, F. W. Sargent, $4; 2d, Oliver Ames, $3; 3d, A. W. Preston, $2.
COLLECTION OF VEGETABLES.— Fifteen varieties:
1st, E. L. Lewis, $10.
Eight varieties:
1st, F. W. Sargent, $5; 2d, Mrs. A. A. Warburton, $4.

Gratuities:—

Oliver Ames, Cucumbers, $2.
Mrs. Frederick Ayer, collection of Tomatoes, $3.
Hittinger Fruit Co., Tomatoes, $1.
W. Heustis & Son, Onions, $1.
F. W. Sargent, Swiss Chard, $1.

DAHLIA AND FRUIT EXHIBITION.

SEPTEMBER 11 AND 12.

TOMATOES.— Collection, distinct varieties, twelve specimens of each variety:
1st, F. W. Sargent, $6.
COLLECTION OF VEGETABLES.— Not less than ten varieties:
1st, D. L. Fiske, $8.

Gratuities:—

F. W. Sargent, Lettuce, $1.
Mrs. N. P. Cutler, collection of Tomatoes, $1.
W. Heustis & Son, Celery, $1.
D. R. Craig, collection of vegetables, $3.
Mrs. Frederick Ayer, " " " $3.

October Show.

October 2 and 3.

Theodore Lyman Fund No. 2.

Beans.— Lima, any variety, four quarts:
1st, Oliver Ames, $3; 2d, F. W. Sargent, $2; 3d, F. W. Sargent, $1.
Lima, any variety, shelled, one quart (for cottagers only):
1st, Michael Cahalan, $3; 2d, John Bauernfeind, $2; 3d, Mrs. Timothy McDermott, $1.
String, four quarts:
1st, F. W. Sargent, $3; 2d, F. W. Sargent, $2; 3d, A. W. Preston, $1.
Wax, four quarts:
1st, D. R. Craig, $3; 2d, D. L. Fiske, $2; 3d, Mrs. Timothy McDermott, $1.
Beets.— Any round variety, twelve roots:
1st, E. L. Lewis, $3; 2d, E. L. Lewis, $2; 3d, D. R. Craig, $1.
Any round variety, six roots (for cottagers only):
1st, J. F. Tilton, $3; 2d, J. A. Nixon, $2; 3d, Michael Cahalan, $1.
Chard, three plants:
1st, D. R. Craig, $3; 2d, E. L. Lewis, $2; 3d, Oliver Ames, $1.
Brussels Sprouts.— Four quarts:
1st, E. L. Lewis, $4.

Society's Prizes.

Broccoli or Kale.— Four heads:
1st, F. W. Sargent, $3.
Cabbage.— Any ball head variety, green, four heads:
1st, D. R. Craig, $4; 2d, Frederick Cole, $3; 3d, E. L. Lewis, $2.
Any flat head variety, four heads:
1st, Mrs. J. L. Gardner, $4; 2d, E. L. Lewis, $3.
Savoy, four heads:
1st, D. R. Craig, $4; 2d, Mrs. J. L. Gardner, $3; 3d, E. L. Lewis, $1.
Red, four heads:
1st, D. R. Craig, $4; 2d, E. L. Lewis, $3; 3d, Frederick Cole, $2.
Any green variety, three heads (for cottagers only):
1st, J. D. Tilton, $4; 2d, Michael Cahalan, $3; 3d, Michael Cahalan, $2.
Carrot.— Danvers, twelve roots:
1st, E. L. Lewis, $4; 2d, D. R. Craig, $3; 3d, Mrs. Lester Leland, $2.
Any red or orange variety longer than Danvers, twelve roots:
1st, E. L. Lewis, $4; 2d, E. L. Lewis, $3.

Six kinds, not more than one variety of a kind:
1st, W. J. Clemson, $15; 2d, Oliver Ames, $10; 3d, J. A. Nixon, $8.
Six kinds, distinct species (for cottagers only):
1st, Mrs. A. A. Warburton, $8; 2d, Michael Cahalan, $6.

Society's Prizes.

VEGETABLES PUT UP IN GLASS JARS.— Best display:
1st, Hermine A. Schulz, $12; 2d, Mrs. G. B. Gill, $10; 3d, Mrs. F. C. Upham, $8.

Gratuities:—

Albert Watson, collection of Potatoes, $15.
C. F. Rowley, collection of Pumpkins, $3.
Mrs. Lester Leland, collection of Onions, $2.
Boston Market Gardeners' Association, collection of vegetables in boxes, $15.
Dr. F. S. DeLue, Improved Golden Bantam Sweet Corn, Honorable Mention.
J. S. Bache, Golden Eagle Sweet Corn, Vote of Thanks.

AUTUMN EXHIBITION OF PLANTS, FLOWERS, FRUITS AND VEGETABLES.

NOVEMBER 4, 5, 6, AND 7.

COLLECTION OF VEGETABLES.— Twelve kinds, not more than one variety of a kind tastefully arranged:
1st, Oliver Ames, $12; 2d, E. L. Lewis, $10; 3d, F. W. Sargent, $8.
Eight varieties:
1st, Elliott & H. W. Moore, $8; 2d, J. W. Stone, $6; 3d, D. L. Fiske, $4.
Collection of vegetables exhibited by seedsmen:
1st, T. J. Grey Co., Silver Medal.

Gratuities:—

T. T. Watts, *Dioscorea Batatas* (Chinese Yam), $2.
Oliver Ames, collection of vegetables, $3.
Mrs. A. A. Warburton, " " " $3.
E. L. Lewis, " " " $3.
Boston Market Gardeners' Association, collection of vegetables, $30.
T. J. Grey Co., collection of vegetables, First Class Certificate of Merit.

THE ROSE GARDEN OF MISS SARAH B. FAY AT WOODS HOLL, MASS.

REPORT OF THE COMMITTEE ON GARDENS FOR THE YEAR 1915.

JOHN K. M. L. FARQUHAR, CHAIRMAN.

The recent policy of the Committee on Gardens, adopted the previous year, for broadening the scope of its activities has been continued through the present season. Early in the year an arrangement was made for a series of field meetings in the Arnold Arboretum to which all members of the Society were invited. Professor John G. Jack of the Arboretum staff was engaged to conduct the party, to give information on the various trees and shrubs as they came into their flowering season, and to answer questions that might be asked concerning the plants under observation.

These meetings were held every Thursday afternoon at three o'clock, beginning April 22 and were continued until June 24. The meetings proved a successful innovation and afforded an unusual opportunity for the members of the Society to become acquainted with the great variety of flowering trees and shrubs suitable for cultivation in the vicinity of Boston.

An additional meeting was held in the Arboretum on the forenoon of October 27, also under the guidance of Professor Jack, for the purpose of viewing the various fruiting trees and berried shrubs. This proved hardly less interesting than the earlier visits during the flowering season.

On the first visit, April 22, thirty-five species and varieties of plants were noted in flower. Among the more conspicuous were the numerous varieties of Forsythias, forming great yellow masses; the various species of Japanese Cherries with their delicate tints of pink and white; and particularly the early flowering *Rhododendron praecox*, a mass of pink bloom, perfectly hardy here, and a most desirable plant for April flowering. The Cornelian Cherry,

a tree covered with yellow bloom was also a noteworthy object in the landscape.

Later in the month the Honeysuckles and Magnolias made a fine showing as well as several of our native shrubs, such as Benzoin, Dirca, Shepherdia, and Amelanchier. The Rhododendrons also were becoming noticeable.

The feature of the Arboretum in late April and early May is the display of Japanese Cherries. These splendid flowering trees are well worthy a long pilgrimage to see, especially the *Prunus Sargentii*, which when in full bloom is without doubt the most beautiful of cultivated trees.

In May were especially noted the Hawthorns in great variety, the Azaleas, Barberries, Philadelphus, and the Lilacs, the latter comprising a collection of more than fifty different varieties.

In June the wild Roses of many species, the Azaleas, Rhododendrons, the Crab Apples, especially the Bechtel's Crab, the finest of them all with double flowers, the Viburnums, Cornels, and Wistarias were conspicuous.

The visit on October 27 was devoted to the fruiting trees and berried shrubs. Especially noteworthy were the wild Apples, Pears, Barberries, Hackberry, and *Celastrus articulatus* in handsome fruit. Much interest in and inquiry concerning wild fruits as a source of food supply for birds was manifested.

The Arboretum is exerting a strong influence throughout the country in promoting the interest in horticulture and the Garden Committee in calling attention to this great assemblage of trees and shrubs is performing a service in harmony with its line of work.

In addition to the eleven field meetings at the Arnold Arboretum two other visits to places of noteworthy horticultural interest in eastern Massachusetts were made which are herewith briefly reported upon.

The Rose Garden of Miss Sarah B. Fay at Woods Hole.

On June 24 the committee was privileged to inspect the rose garden of Miss Sarah B. Fay at Woods Hole. Here are grown

VIEW ON ESTATE OF GEORGE E. BARNARD, IPSWICH, MASS.

some four hundred varieties of hardy garden roses including practically every known kind suitable for cultivation in this section of the country. The success of this rose garden is largely due to Miss Fay's enthusiasm, supplemented by the cultural skill of Michael H. Walsh, and the result has been the formation of a collection of roses celebrated throughout the country.

The garden is of especial interest from the fact that here were originated some of the most popular varieties of the Rambler class of Roses, such as Lady Gay, Hiawatha, Debutante, Lucile, Excelsa, and Wedding Bells, the work of Mr. Walsh, who has charge of the estate. These have elicited the highest commendation of horticulturists both in the United States and in Europe.

As an expression of appreciation of Miss Fay's interest in the development of rose culture the committee voted to award her the Society's Gold Medal in recognition of her life-long devotion to the rose.

In addition to the rose gardens Miss Fay's estate is an example of successful reforestation on a large scale. In 1851, when the late Joseph S. Fay took possession of the place, consisting of several hundred acres of barren hills and pasture land, it was practically treeless. Through his persistent work in planting the ground is now covered with a heavy growth of Pines, Spruces, Oaks, and other trees, showing the possibilities of tree cultivation even in such exposed and wind-swept situations as the hills of Cape Cod.

George E. Barnard's Estate at Ipswich.

On July 9 the committee visited for the fourth time in recent years the notable estate of George E. Barnard at Ipswich. Continued improvement marks the progress of this place and probably on no other estate in eastern Massachusetts can be seen a larger variety of herbaceous flowering plants. These were in exceptionally fine condition on the occasion of the committee's visit. The rock garden, especially, occupying an adjoining hillside and now well covered with alpine and other plants, was a feature of more than usual interest. As Mr. Barnard had already received in previous years the Society's medals, as well as the award of the

H. H. Hunnewell Triennial Premium in 1910 the committee voted at this visit to award him a Special Diploma in recognition of the notable development of the Riverbend Estate and especially for the rock garden and borders of herbaceous flowering plants.

JOHN K. M. L. FARQUHAR
ROBERT CAMERON
DAVID R. CRAIG
JACKSON T. DAWSON
WILLIAM DOWNS
ARTHUR H. FEWKES
T. D. HATFIELD

Committee on Gardens.

REPORT OF THE COMMITTEE ON CHILDREN'S GARDENS.

By Henry Saxton Adams, Chairman.

The annual exhibition of the products of children's gardens was held at Horticultural Hall on Saturday and Sunday, August 28 and 29.

The appropriation for prizes was $300.00, of which amount $200.00 was given by the State for the encouragement of agriculture among the children. One hundred and fourteen awards were made aggregating $296.75.

In addition to the scheduled list of prizes many additional awards were made for meritorious exhibits as far as the funds devoted to this purpose would permit and it was with regret that the committee was obliged to pass by others which well deserved some recognition.

A noteworthy feature of the exhibition was the large and interesting displays of preserved fruits and vegetables in glass jars made by the Brockton High School Canning Club and by Miss Hermine Schulz of Roslindale. These displays attracted much attention and numerous inquiries were made of the exhibitors as to the methods employed in securing such satisfactory results.

Nineteen school gardens in eastern Massachusetts were represented in the exhibition and the entries for the classes of vegetables, especially, exceeded all previous record. There were 40 plates of string beans exhibited, 31 of beets, 25 of corn, 23 of potatoes, 32 of carrots, 31 of tomatoes, and 32 squashes and pumpkins.

On the whole the exhibition was fully up to the standard of previous years and in quality and quantity of exhibits showed clearly the continued interest in the children's garden movement inaugurated by this Society thirty-seven years ago.

A list of the principal awards made is appended to this report.

For the best collection of vegetables from a school garden:

First.— Copeland School Garden, Brockton $6 00
Second.— Groton School Garden 5 00
Third.— Sterling St. Garden, Roxbury 4 00
Fourth.— Norfolk House Centre Garden, Roxbury 3 00
Fifth.— Greenwood School Gardens, Hyde Park 2 00

For the best collection of vegetables from a school garden established since January 1, 1912:

First.— Copeland School Garden, Brockton 5 00
Second.— North Grammar School Garden, Waltham 4 00
Third.— Belcher School Garden, East Milton 3 00
Fourth.— Brook Road School Garden, Milton 2 00
Fifth.— Greenwood School Gardens, Hyde Park 1 00

For the best collection of flowers from a school garden:

First.— Greenwood School Gardens, Hyde Park 6 00
Second.— Sterling St. Garden, Roxbury 5 00
Third.— Norfolk House Centre Garden, Roxbury 4 00

For the best collection of flowers from a school garden established since January 1, 1912:

First.— Copeland School Flower Garden, Huntington District, Brockton 5 00
Second.— Groton School, Garden 4 00
Third.— Greenwood School Gardens, Hyde Park 3 00
Fourth.— Young People's Garden, Deerfield St., Boston 2 00
Fifth.— North End Garden, Boston 1 00

For the best collection of vegetables from a child's home garden:

First.— Hermine Schulz, Roslindale 5 00
Second.— Robert Fisher, Waltham 4 00
Third.— Gust W. Anderson, Brockton 3 00

For the best collection of flowers from a child's home garden:

First.— Gertrude Schulz, Roslindale 5 00
Second.— John Thatcher, Brookline 4 00
Third.— Florence E. Watson, Dorchester 3 00

For the best vase of flowers in vari ty from a child's home garden, arranged with any foliage:

First.— Martha A. Townsend, Lynn 3 00
Second.— William C. Albrecht, Roslindale 2 50
Third.— Florence E. Watson, Dorchester 2 00

For the best collection of native flowers, berries, leaves, and grasses, correctly named as far as possible:

First.— Lester D. Watson, Dorchester	5 00
Second.— Albert Davidson, Melrose	4 00
Third.— Catherine Fuller, Waltham	3 00

For the best collection of flowers from a roof garden in the City of Boston:

First.— South Bay Union Roof Garden	5 00
Second.— Gertrude Entner	3 00

HENRY SAXTON ADAMS
PHILIP P. CHASE
DR. HARRIS KENNEDY
MRS. W. RODMAN PEABODY
HARRY S. RAND
MISS MARGARET A. RAND
WILLIAM P. RICH
JAMES WHEELER

Committee on Children's Gardens.

REPORT OF THE COMMITTEE ON LECTURES AND PUBLICATIONS FOR THE YEAR 1915.

By Wilfrid Wheeler, Chairman.

The course of lectures conducted by the Society in 1915 was attended by about 2000 persons, especial interest being taken in those lectures which were given on fruit or vegetable growing; in fact for the past few years the largest attendance at our lectures has been at those where fruit has been the subject discussed.

In making up the course this year a very strenuous effort was made to secure speakers of national reputation, with the idea of cutting down the course to fewer lectures and getting those speakers who might only be secured on payment of a larger fee. Although many persons were written to very little favorable response was received, and your committee has had to revert to lecturers secured fairly nearby.

The course as offered this year covers a wide range of subjects and should attract considerable interest.

Your committee believes that a more concerted advertising campaign would bring in more people to this course. Posters should be used in conspicuous places, car dasher signs used as in our shows, and more newspaper publicity would give the people interested an idea of what is going on.

Your committee would recommend that the Society purchase a lantern for use in illustrating lectures. A very good electric lantern may be purchased for about $50.00 and can be operated by the janitor or his assistant. Such a lantern would nearly save its cost in one year, as frequently the Society spends $40.00 a year for such service.

The following programme of lectures for 1916 is submitted:

January 8. Flowers and Gardens of Japan. Illustrated. By E. H. Wilson, Jamaica Plain.

January 15. Vegetables for Home and Exhibition. By Edwin Jenkins, Lenox.

January 22. Annual Meeting, Mass. Fruit Growers' Association, January 21 and 22. Addresses on Fruit Growing, forenoon and afternoon.

January 29. The Missouri Botanical Garden. Illustrated. By Dr. George T. Moore, St. Louis, Mo.

February 5. Alfalfa Culture in New England. By Prof. S. C. Damon, Kingston, R. I.

February 12. The Development of Fruits for Special Conditions. By Prof. W. T. Macoun, Ottawa, Canada.

February 19. Some History of the Grape in the United States. Illustrated. By George C. Husmann, Washington, D. C.

February 26. Garden Writings in America. By Leonard Barron, Garden City, N. Y.

March 4. Practical Demonstration of the Methods Used in the Propagation of Plants. By Theophilus D. Hatfield, Wellesley.

March 11. Taming the Wild Blueberry. Illustrated. By Frederick V. Coville, Washington, D. C.

March 25. Sweet Pea Diseases and their Control. Illustrated. By Prof. J. J. Taubenhaus, Newark, Del. *The John Lewis Russell Lecture.*

WILFRID WHEELER
GEORGE B. DORR
F. C. SEARS
FRED A. WILSON
} *Committee on Lectures.*

REPORT OF THE DELEGATE TO THE STATE BOARD OF AGRICULTURE FOR THE YEAR 1915.

By Edward B. Wilder, Delegate.

The Board has continued its usual departments of work during the past year. These include inspection of nurseries and imports of nursery stock, inspection of apiaries, the work on the protection of birds by the State Ornithologist, the enforcement of the oleomargarine and butter laws by the Dairy Bureau, the supervision of the Farmers' Institute Work, and the publication of bulletins and circulars on agricultural subjects.

One notable piece of agricultural legislation was passed in 1915, namely, the apple grading law, and the enforcement of this has been placed under the Secretary of the Board of Agriculture. This law does not go into effect until July 1, 1916, and in order to educate growers up to its provisions the Board held a series of demonstrations throughout the state in October, and brought Mr. W. H. Woodworth, of Nova Scotia, down to Massachusetts to take charge of these meetings.

Meetings.

The annual meeting of the Board was held in January, 1915, and at that time the regular routine reports were read and the policy of the department outlined for the coming year.

The summer field meeting was held at Pines Stock Farm, Leominster, the summer residence of Mr. L. L. Richardson, president of the Worcester North Society. Mr. Richardson is making a specialty of breeding coach and trotting horses, and so the question of horse raising was made a special feature of the day. Professor J. A. McLean of the Agricultural College spoke on raising farm horses, and Mr. Richardson exhibited some of his prize winners.

There was also a demonstration on beekeeping, a talk on the use of concrete, and a demonstration of farm tractors.

The Public Winter Meeting was held at Horticultural Hall, Boston, on January 4, 5, and 6, 1916, in coöperation with this Society, the Massachusetts Dairymen's Association, Massachusetts Milk Inspector's Association and the New England Alfalfa Growers' Association. A strong list of speakers was presented, including Dr. Harvey W. Wiley, who spoke twice, once on "Health on the Farm" and once on "Milk Inspection from the Producer's Standpoint"; Dr. Charles E. North, of New York, on "The Grading and Laboratory Testing of Milk as a Substitute for Dairy Inspection"; Mrs. Sarah T. Rorer on Domestic Science; Junius S. Cates, of the United States Department of Agriculture, on "Farm Management"; H. R. Lewis, of New Jersey, on "Poultry and Egg Production"; and Myron T. Herrick, of Cleveland, Ohio, on "Rural Credits."

In connection with this meeting there was a good exhibition of both corn and apples and an exhibit of boys' and girls' home and school garden club work. The State Ornithologist also made a very interesting exhibit of means of attracting birds and the Massachusetts Dairymen's Association held its annual milk show.

Contests.

At the summer field meeting at Leominster a horse-judging contest was held, at which prizes were awarded as follows: —

Class 1.— For practical farmers: First, R. E. Monk, Pratts Junction, $12; Second, J. A. Williams, Northbridge, $8; third, H. G. Worth, Nantucket, $4.

Class 2.— For boys eighteen years of age or under; First, Leo Donnelly, North Leominster, $10; second, A. H. Harris, North Leominster, $5; third, Gordon Nightingale, Petersham, $3.

In the spring the Board conducted a tent caterpillar contest for school children, in which cups were offered to the towns whose school children should collect the largest number of egg clusters. This contest was very successful, and a total of 2,303,331 egg clusters were collected. The first prize in the class for towns of

over 5,000 inhabitants was won by the town of Northbridge, for 276,801 clusters; second, by the town of Abington, for 212,191; first prize in the class for towns under 5,000, by the town of Sutton, for 197,932 clusters; second, by the town of Medfield, with 122,563.

The New England Fruit Show, which has now become a biennial event in Boston, was held at the Mechanics Building from October 23 to 30, and the Board took care of the Massachusetts prize winners, as well as offering a sweepstakes prize for the Massachusetts fruit grower who should win the largest number of prizes. This was in the form of a silver pitcher, and was won by Mr. J. T. Geer of Three Rivers.

The appropriation for the encouragement of orcharding was used this year as prize money in a contest for apple, pear, and peach orchards. This was in charge of the committee on orcharding and fruit growing of the Board. Mr. F. Howard Brown, the secretary of the Massachusetts Fruit Growers' Association, was the judge of this contest, the results of which were as follows:

Class 1. Peaches.

Section 1.— For the best yield of marketable fruit from an acre of bearing peach orchard: First, R. Bemis Smith, North Andover, $25.

Section 2.— For the largest crop of marketable peaches from a single peach tree: First, J. Corey & Son, Truro, $10; second, R. Bemis Smith, North Andover, $5.

Class 2. Pears.

Section 2.— For the best crop from a single tree; First, W. A. Root, Easthampton, $10.

Class 3. Apples.

Section 1.— For the best orchard of 1 acre of standard apple trees; trees not less than three nor more than five years old: First, John W. Howes, Ashfield, $25; second, G. Warner, Littleton, $15;

third, Ralph Barnes, Marlborough, $10. (Honorable mention and gratuity, W. H. Atkins, South Amherst, $5).

Section 2.— For the best orchard of not less than 3 acres; trees not less than three nor more than five years old: First, H. A. Dunbar, Richmond, $25; second, H. L. Frost, Littleton, $15; third, Penney Brothers, Saugus, $10. (Honorable mention and gratuities, C. A. Wilson, Medway, $5; A. A. Marshall, Fitchburg, $5).

Section 3.— For the best apple orchard in bearing, size of orchard not specified; trees not to exceed fifteen years planted: First A. A. Marshall, Fitchburg, $25; second, Patten Brothers, Sterling, $15; third, W. H. Atkins, South Amherst, $10.

Section 4.— For best old apple orchard renovated: First, W. A. Root, Easthampton, $25; second, Naquag Farm, Rutland, $15; third, Minna B. and Mabel F. Noyes, Methuen, $10.

Section 5.— For best yield of marketable apples from a single tree not older than fifteen years: First, A. A. Marshall, Fitchburg, $10; second, W. H. Atkins, South Amherst, $5.

Section 6.— For best yield of marketable apples from a single tree older than fifteen years: First, W. H. Atkins, South Amherst, $10; second, W. A. Root, Easthampton, $5.

In the class for best yield from a single tree under fifteen years of age, Mr. A. A. Marshall of Fitchburg won first with a tree which produced 21 boxes of apples in 1915. This tree, a McIntosh, set in 1904, has in the past five years 70 boxes of apples to its credit. As these have probably not sold for an average of less than $2.50 a box, this one tree must be credited with a production of $175 for five years. The Marshall orchard also won the prize for the best orchard of bearing trees not to exceed fifteen years planted. In this class the health, vigor, and appearance of the trees were taken into consideration, and also a sworn statement of the yield. This orchard yielded about 2,010 boxes, and the estimated receipts were about $6,000.

Wright A. Root of Easthampton also had a very creditable showing in this class, with a total yield of 313 bushels from 120 young trees.

In the class for renovated apple orchards, Mr. Root of Easthampton made a remarkable record with 970 bushels of apples

from 66 trees which ranged in age from twenty-five to seventy-five years. The total receipts from this orchard were $1,270.

W. H. Atkins of South Amherst made a good record in selling $48.86 worth of apples from a single McIntosh tree set in 1890.

This is the second contest of this sort that has been conducted by the Board of Agriculture, the first one having occurred in 1911. From the report of the judge this year, it is very evident that orchardists throughout the State are taking much better care of their trees, and that four years has seen a great improvement in orchard methods. Undoubtedly the New England Fruit Shows, of which four have now been held, and such contests as the one just ended, have helped by encouraging orchardists and teaching them better methods not only of culture but of sorting and packing their fruit.

Publications.

Several notable publications have been issued during the past year. Mr. Edward Howe Forbush, the State Ornithologist, has written a treatise on "Rats and Rat Riddance" which covers experiments carried on during a number of years. Two bulletins were prepared specially for the Panama-Pacific Exposition, one on "Opportunities for Fruit Growing in Massachusetts" and another on "Opportunities for Poultry Culture."

Six thousand copies of "Agriculture of Massachusetts" for 1914 were printed and the demand has been such that the supply is now practically exhausted.

The following is a list of the publications issued in 1915:

Name of Publication.	*Number.*
Agriculture of Massachusetts, 1914,	6,000
Bulletin No. 3,[1] Grasses and Forage Crops,	2,500
Bulletin No. 4,[2] Small Fruits and Berries,	5,000
List of Available Publications,	5,000
Circular No. 9,[1] What it costs to produce Milk in New England,	5,000
Circular No. 17,[1] Poultry Feeds	3,500
Circular No. 31,[1] Farmer's Interest in Game Protection,	2,000

[1] Second edition revised.
[2] Third edition revised.

Circular No. 32,[1] Beef Production	5,000
Circular No. 33,[1] Profitable Poultry Production,	7,000
Circular No. 34,[1] Household Accounting,	6,000
Circular No. 35,[1] Alfalfa,	5,500
Circular No. 36,[1] Economical Milk Production	5,500
Circular No. 37,[1] Truck Farming,	4,500
Circular No. 38,[1] Encouragement of Clean Milk,	5,000
Circular No. 39,[1] Farm Accounting,	6,000
Circular No. 40,[1] Co-operation in Fruit Growing,	6,000
Circular No. 41,[1] Cranberry Growing,	3,000
Circular No. 42,[1] Home Vegetable Garden,	7,500
Circular No. 43,[1] Sanitary Water Supplies,	4,000
Circular No. 44,[1] Sewage Disposal,	4,500
Circular No. 45, The Starling	2,500
Circular No. 46, The Tent Caterpillar,	2,000
Circular No. 47, Bird Houses,	3,500
Circular No. 48, English Sparrow,	2,500
Circular No. 50, Apple-packing Law,	3,000
Circular No. 51, Tobacco Growing,	6,000
Circular No. 52, Onion Growing,	6,000
Economic Biology Bulletin No. 1, " Rats & Rat Riddance,"	8,000
Nature Leaflet No. 7,[2] Potato Scab,	1,500
Nature Leaflet No. 8 (reprint),	1,500
Nature Leaflet No. 9 (reprint),	2,000
Nature Leaflet No. 18 (reprint),	1,500
Nature Leaflet No. 29 (reprint),	2,000
Nature Leaflet No. 30 (reprint),	2,000
Nature Leaflet No. 31 (reprint),	2,000
Nature Leaflet No. 32 (reprint),	2,000
Nature Leaflet No. 45 (reprint),	1,500
Apiary Inspection Bulletin No. 5,[3] Some Essentials of Beekeeping,	1,500
Thirteenth Annual Report, State Nursery Inspector	450
Fifth Annual Report of State Inspector of Apiaries (Apiary Inspection Bulletin No. 9),	1,600
Seventh Annual Report of State Ornithologist,	2,000
Twenty-fourth Annual Report of Dairy Bureau,	700
First Annual Report of Boys' and Girls' Club Work,	5,000
Directory of Agricultural Organizations,	200
Report of Encouragement of Dairying Contests,	1,000
Manual of Dairy Laws,	1,000
Institute questionnaire, Orcharding,	10,000
Institute questionnaire, Farm Garden,	10,000

[1] Separate from Sixty-second annual report.
[2] Formerly potato and apple scab.
[3] Second edition revised.

Institute questionnaire, Poultry,	10,000
Institute questionnaire, Strawberries,	5,000
Institute questionnaire, Crops and Marketing,	5,000
Institute questionnaire, Raspberries and Blackberries,	5,000
Institute questionnaire, Currants and Gooseberries,	5,000
Institute questionnaire, Soils,	5,000
Institute questionnaire, Dairying.	5,000
List of Institute speakers,	400

REPORT OF THE SECRETARY AND LIBRARIAN FOR THE YEAR 1915.

There has been no marked event to record in the history of the Society during the year just passed, but it may be said that the activities of its various lines of work have been well sustained and consequently a healthy condition prevails.

Twelve exhibitions have been held during the year which have been fully up to the Society's high standard of excellence and the public interest in them shows no abatement, in fact the attendance has noticeably increased.

The annual Spring Show in March was the most successful in recent years and called forth enthusiastic expressions of delight from the visitors. It emphasizes the fact that this month, as past experience has amply shown, is the one in which there is the greatest interest on the part of the public in a flower show. After the long, cold winter the signs of a returning springtime are hailed with pleasure and the people are hungry for the feast of plants and flowers spread before them.

The Dutch Garden of the Farquhars and the exhibition of roses by the American Rose Society were the leading features of the Spring Exhibition and its success was due in great measure to these exhibits.

The Peony Show in June was of more than the usual interest on account of the Annual Meeting and Exhibition of the American Peony Society which was held in connection with it.

A new award has been prepared this year called the Certificate of Honorable Mention. It is designed to recognize special exhibits not entered in competition for the Schedule Prizes. This award fills a long felt want for some suitable recognition of deserving exhibits and takes rank next below that of the First Class Certificate.

Several amendments to the By-laws of the Society have been adopted during the year. The intent of them is to allow the

Trustees to make appropriations for prizes several years in advance in order that intending exhibitors may have more time to prepare special exhibits and to grow the plants called for in the Schedule.

The publications of the year and the dates of issue have been as follow:

January 12. Schedule of Prizes and Exhibitions for the year 1915, 61 pp.

April 6. Transactions, 1914, Part II, pp. 181–323 and Plates 1–10.

August 6. Transactions, 1915, Part I, pp. 1–112 and Plates 1 and 2.

September 15. Preliminary Schedule of Prizes for March and May, 1916, exhibitions, 8 pp.

The Library.

The preparation of the copy for the new catalogue of the library has progressed steadily throughout the year and it is hoped in the next annual report of the Librarian to announce its publication.

In addition to the usual accessions through the Society's appropriation and the income of the French and Farlow Funds acceptable gifts of books have been made by Messrs. Arthur F. Estabrook, Thomas N. Cook, Edward E. Norton, and Horace E. Ware.

Many additions have been made to the collection of horticultural trade catalogues during the year and the number of them now amounts to 9206. Mr. E. O. Orpet presented a collection of 56 orchid catalogues and Mr. William C. Lane, Librarian of the Harvard College Library, sent a large number of miscellaneous trade catalogues, a goodly proportion of which were desirable additions to the collection.

William P. Rich,
Secretary and Librarian.

REPORT OF THE TREASURER FOR THE YEAR 1915.

MASSACHUSETTS HORTICULTURAL SOCIETY *in account current with* WALTER HUNNEWELL, *Treasurer, December 31, 1915.*

DR.

Paid for Library from Appropriation	$244 21
" " " " J. D. W. French Fund	162 35
" " " " J. S. Farlow Fund	96 56
" " Heating	988 18
" " Lighting	1,149 96
" " Labor	2,080 80
" " Stationery and Printing	1,493 59
" " Postage	228 00
" " Insurance	317 57
" " Incidentals	1,888 72
" " Repairs	513 67
" " Committee on Lectures and Publications	239 65
" " Salaries of Officers	4,301 66
" " " Committee on Plants and Flowers	398 87
" " " " " Fruits	170 20
" " " " " Vegetables	192 00
" " Committee on Prizes & Exhibitions	253 15
" " Expenses Committee on Gardens	45 00
" " Medals	102 38
" " Prizes for Plants and Flowers	4,584 00
" " Prizes for Fruits	1,276 00
" " Prizes for Vegetables	1,247 00
" " Prizes for Children's Gardens	296 75
" " H. A. Gane Fund	30 00
" " John C. Chaffin Fund	26 00
" " John Lewis Russell Fund	40 00
Balance December 31, 1915, Treasurer and Bursar	8,072 41
	$30,438 68

Cr.

Balance December 31, 1914			$4,423 76
Received Rents		4,014 99	
" Exhibitions	3,322.15		
" less expenses	1,224.93	2,097 22	
" Membership Fees (457. Income a/c, 375. Perm. Fund)		832 00	
" State Bounty		1,000 00	
" Sundry Donations		151 00	
" Mount Auburn Cemetery (1991.99 Income a/c, 1991.99 Perm. Fund)		3,983 98	12,079 19
" Interest on securities from the following funds:			
S. Appleton		40 00	
J. A. Lowell		40 00	
T. Lyman		440 00	
J. Bradlee		40 00	
B. V. French		20 00	
H. H. Hunnewell		160 00	
W. J. Walker		94 16	
L. Whitcomb		20 00	
B. B. Davis		20 00	
M. P. Wilder		40 00	
J. L. Russell		40 00	
F. B. Hayes		400 00	
H. A. Gane		40 00	
J. S. Farlow		100 00	
J. D. W. French		200 00	
B. H. Pierce		32 00	
J. C. Chaffin		40 00	
B. V. French, No. 2		120 00	
G. R. White		240 00	
J. S. Farlow, Newton		116 00	
J. A. French		200 00	
			2,442 16
" Interest and dividends on securities other than those for the above funds			9,823 57
" Library Catalogue			1,670 00
			$30,438 68

Assets.

Real Estate	$518,564 63
Furniture and Exhibition Ware	10,796 96
Library	45,110 47
Plates and History	235 50
$2,000 Kansas City, Clinton, and Springfield Bonds	1,980 00
10,000 Lake Shore and Mich. So. Bonds	10,415 25
21,000 City of Newton Bonds	24,228 75
50,000 Atch. Topeka and S. F. Bonds	44,693 25
50,000 Chicago Burl. and Quincy Bonds	50,012 50
10,000 Chicago and West Mich. Bonds	9,987 50
25,000 K. C. F. S. and Memphis Bonds	27,523 75
50,000 C. B. and Q. Illinois Bonds	51,625 00
8,000 Boston and Maine Bonds	8,710 00
4,000 Am. Tel. & Tel. 4 % Bonds, 1936	4,110 00
4,000 United Fruit 5 % Notes, 1918	3,840 00
4,000 Interboro 5 % Bonds, 1966	3,920 00
12,000 Pacific Telephone Bonds	11,670 00
260 shares General Electric Stock	12,909 90
Hayes and Loring, Trustees	2,308 66
Cash in hands of Treasurer and Bursar	8,072 41
	$850,714 53

Liabilities.

Funds invested in Bonds and Stocks:

S. Appleton	Fund	$1,000 00
J. A. Lowell	"	1,000 00
T. Lyman	"	11,000 00
J. Bradlee	"	1,000 00
B. V. French, No. 1	"	500 00
H. H Hunnewell	"	4,000 00
W. J. Walker	"	2,354 43
L. Whitcomb	"	500 00
B. B. Davis	"	500 00
M. P. Wilder	"	1,000 00
J. L. Russell	"	1,000 00
F. B. Hayes	"	10,000 00
H. A. Gane	"	1,189 00
J. S. Farlow	"	2,503 44
J. D. W. French	"	5,148 51

B. H. Pierce	"	$800 00	
J. C. Chaffin	"	1,259 89	
B. V. French, No. 2	"	3,000 00	
J. A. French	"	5,000 00	
G. R. White	"	6,103 08	
J. S. Farlow, Newton	"	2,900 42	
Library Catalogue	"	1,670 00	$63,428 77
Surplus			787,285 76
			$850,714 53

WALTER HUNNEWELL.
Treasurer.

MEMBERSHIP OF MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 31, 1915.

Life Members, December 31, 1914		775	
Added in 1915		15	
Changed from Annual		1	
		791	
Deceased		18	773
Annual Members, December 31, 1914		162	
Added in 1915		6	
		168	
Deceased	4		
Changed to Life	1		
Resigned	2	7	161
Membership, December 31, 1915			934

INCOME FROM MEMBERSHIP.

15 New Life members at $30	$450 00
6 New Annual Members at $10	60 00
1 changed to Life	20 00
Assessments for 1915	302 00
	$832 00

WALTER HUNNEWELL,
Treasurer.

AUDITOR'S CERTIFICATE.

40 State Street, Boston,
March 4, 1916.

To the Finance Committee of the
Massachusetts Horticultural Society.

Gentlemen:

As requested by you I have made a thorough audit of the books and general accounting affairs of the Massachusetts Horticultural Society for the year which ended with the thirty-first day of December, 1915, and herewith submit to you my report of the same.

Report.

I have proved the correctness of the ledger, journal, and cash books and the small books tributary to the cash books, and saw that all balances were properly carried forward. I examined all vouchers and checks representing the disbursements during the year and found the amount of cash required by the cash book upon the first day of January, 1916, to have been on hand, and also examined the securities of the Society, finding them in all details in accordance with the requirements of the records. I traced all postings from the journal and cash books into the ledger and certify that the balance sheet taken from it as of the 31st of December, 1915, is a correct abstract and that the Treasurer's statement of the assets and liabilities of the Society upon said date is true to the best of my knowledge and belief.

In short, I satisfied myself that the work in connection with the accounting affairs of the Society is being intelligently and faithfully performed and that the books and papers of the Society are in commendable condition.

Yours very respectfully,

Andrew Stewart,
Certified Public Accountant.

THE ANNUAL MEETING, NOVEMBER 13, 1915.

ANNUAL MEETING FOR THE YEAR 1915.

The Annual Meeting of the Massachusetts Horticultural Society for the year 1915 was held at Horticultural Hall, Boston, on Saturday, November 13, at twelve o'clock, noon, with President Farquhar in the chair.

The Secretary announced that the meeting was called in accordance with the requirements of the By-laws of the Society for the purpose of electing a President, a Vice-President, four Trustees, and a Nominating Committee for the ensuing year and also for the approval of certain duly proposed amendments to the By-laws of the Society and for the transaction of such other business as might be legally presented.

The President appointed E. B. Wilder, J. A. Crosby, and W. P. Rich a committee to receive, assort, and count the ballots, and report the number, and declared the polls open, to remain open until three o'clock.

The record of the preceding meeting of the Society was read by the Secretary and duly approved.

President Farquhar stated that in compliance with the provisions of Section IX. of the By-laws the Board of Trustees had made an appropriation of $6000.00, in addition to the income of the special prize funds of the Society, for prizes and gratuities for the year 1916 and $350.00 for prizes for children's gardens, and also that the unexpended balance of the appropriation for the year 1915 was to be added to that of the ensuing year.

No other business being presented the President declared an intermission until three o'clock and appointed Mr. Wilder as Chairman *pro tem.*

At three o'clock Chairman Wilder declared the polls closed and the ballot committee proceeded to assort and count the ballots with the following result:

Whole number of ballots cast, 21.

For President, Richard M. Saltonstall had 21.

For Vice President, Walter Hunnewell had 21.

For Trustees, George E. Barnard, 21; William C. Endicott, 21; Arthur F. Estabrook, 21; John K. M. L. Farquhar, 19.

For Nominating Committee, Arthur F. Estabrook, 21; Richard Hittinger, 20; John G. Jack, 20; Thomas Roland, 20; John L. Smith, 20.

The amendments to the By-laws received the following votes:

No. 1, Yes, 19, No, 0; No. 2, Yes, 19, No, 0; No. 3, Yes, 18, No, 1.

Chairman Wilder declared the following named persons to be the duly elected officers of the Society for the year 1916:

President	RICHARD M. SALTONSTALL
Vice President (for two years)	WALTER HUNNEWELL
Trustees (for three years)	GEORGE E. BARNARD
	WILLIAM C. ENDICOTT
	ARTHUR F. ESTABROOK
	JOHN K. M. L. FARQUHAR
Nominating Committee	ARTHUR F. ESTABROOK
	RICHARD HITTINGER
	JOHN G. JACK
	THOMAS ROLAND
	JOHN L. SMITH

He also declared that the several amendments to the By-laws had received the necessary two-thirds vote and were duly approved.

The meeting was then dissolved.

WILLIAM P. RICH,
Secretary.

NECROLOGY, 1915.

NECROLOGY, 1915.

EDWARD KENDALL, formerly of Cambridge, Massachusetts, died in Holden January 6, 1915, in his 94th year. For more than fifty years Mr. Kendall was engaged in the manufacture of steam boilers in Cambridge and was also actively interested in the religious and civic affairs of his city and state. He had been a member of the Society since 1868.

OLIVER HAZARD PERRY of Lowell, Massachusetts, a member of the Society since 1904, died in Boston January 11, 1915, at the age of 63. Mr. Perry was born in Lawrence June 15, 1851, and was engaged for many years in the management of woolen mills in Lowell. He was a grandson of Commodore Oliver Hazard Perry of the War of 1812.

JAMES C. MELVIN of West Newton, Massachusetts, died in Boston January 19, 1915, in his 67th year. Mr. Melvin was well known in the market district of Boston as the manager of the Quincy Market Cold Storage Company and was also interested in many of the charitable institutions and business enterprises of the city and vicinity. He enlisted in the Civil War with his three brothers and was the only one of them to return alive. He became interested in the Society in 1885.

MISS MARIA E. CARTER of Woburn, Massachusetts, died in that town January 21, 1915, in her 70th year. Miss Carter was much interested in natural history studies and for a number of years was a frequent exhibitor of native plants at the exhibitions of the Society of which she had been a member since 1867.

CHARLES WALLINGFORD PARKER of Boston died January 24, 1915, at the age of 83. Mr. Parker was born in Framingham, Massachusetts, June 27, 1831. At the age of 19 he entered the

clothing business in Worcester as a clerk, and in 1852 removed to Boston with the firm of which he soon became a partner under the widely known name of Macullar, Williams & Parker.

He was a man of many interests in life outside of his business connections and a memorial of him in relation to his services to this Society will be found on page 121 of this publication. He became a member of the Society in 1891.

WILLIAM H. FORBES of Winchester, Massachusetts, and a member of the Society since 1885, died in that town February 3, 1915, in the 79th year of his age. Mr. Forbes was born in England and came to this country at an early age entering the business of a lithographer as an apprentice. Throughout the rest of his life he devoted himself to that occupation developing an extensive business with a large manufacturing plant at Revere.

CHARLES EDWIN BESSEY, PH.D., a Corresponding Member of the Society since 1889, died in Lincoln, Nebraska, February 25, 1915. Dr. Bessey was Professor of Botany in the University of Nebraska and was a frequent contributor to botanical literature.

JOSEPH HUNTINGTON WHITE of Brookline, Massachusetts, died at his home in that town March 10, 1915, in the 92d year of his age. In former years he was a frequent exhibitor at the Society's exhibitions of the products of his fine estate at Brookline. He became a member of the Society in 1888.

CHARLES MERRIAM of Weston, Massachusetts, a member of the Society since 1907, died at his home in that town March 28, 1915, in his 44th year.

MISS HELEN COLLAMORE of Boston died April 17, 1915, in her 80th year. Miss Collamore was practically interested in many of the philanthropic and educational institutions of Boston which received material aid through her generosity. She had been a member of the Society since 1887.

COL. GUSTAVUS B. BRACKETT, a Corresponding Member of the Society since 1900, died in Washington, D. C., August 3, 1915. He was born in Unity, Maine, March 24, 1827.

Col. Brackett was a well-known horticulturist and a leading authority on all matters relating to fruits. For the past 18 years he had been Chief of the Division of Pomology of the U. S. Department of Agriculture.

PATRICK NORTON, well known to the older horticulturists of Boston, died at his home in Dorchester September 9, 1915, at the age of 76 years. For a quarter of a century Mr. Norton was actively interested in the affairs of the Society serving as a member or chairman of various committees. He was chairman of the old Committee of Arrangements during the years 1890 and 1891, and of the Committee on Gardens from 1898 to 1903. He was also a member of the Committee on Plants and Flowers from 1877 to 1884.

Mr. Norton was one of the most companionable and courteous of men and his memory is held in high esteem by all who were privileged with his acquaintance. He had been a member of the Society since 1869.

GEORGE W. JAMESON of East Lexington, Massachusetts, was born in Windsor, Maine, September 25, 1833, and died in Waltham, Massachusetts, September 13, 1915. He became a member of the Society in 1869 and was for many years a constant exhibitor of fruits, especially, from his orchard and farm at Lexington.

ALEXANDER S. PORTER, a member of the Society since 1899, died in Boston October 1, 1915, in his 76th year. For many years he was engaged in the real estate business in this city.

FRANCIS CHARLES FOSTER of Cambridge, Massachusetts, a member of the Society since 1883, died in that city October 24, 1915, at the age of 86.

ARTHUR THEODORE LYMAN of Waltham, Massachusetts, died in that city October 24, 1915, at the age of 83 years. Mr. Lyman in addition to his large business interests was much devoted to the objects of the Society and took pride in the development and planting of his large estate in Waltham. He was elected to membership in the Society in 1914.

AUGUSTUS ELWIN SCOTT of Lexington, Massachusetts, a member of the Society since 1871, died at his home in that town November 19, 1915, at the age of 77. Mr. Scott was practically interested in horticultural and botanical matters as well as in the political affairs of his town and state. He was a member of the Massachusetts House of Representatives in 1879 and 1880 and a State Senator in 1885.

W. ATLEE BURPEE, the noted horticulturist and seedsman of Philadelphia, died in Doylestown, Philadelphia, November 26, 1915, at the age of 57. Mr. Burpee started in the seed business in Philadelphia in 1876 which soon developed into one of the largest and best known establishments in the country.

He also carried on extensive gardens in several other states for the purpose of testing new introductions and the propagation of plants, flowers, fruits, and vegetables. He was elected to membership in the Society in 1911.

JOHN L. BIRD of Dorchester, Massachusetts, died November 30, 1915, in his 81st year. Mr. Bird was engaged in the drug business in Boston for over half a century. He was much devoted to fruit culture and for many years was a constant exhibitor of fruits from his gardens in Dorchester at the exhibitions of the Society of which he became a member in 1867.

OFFICERS, COMMITTEES, AND MEMBERS, 1915.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1915.

President.

JOHN K. M. L. FARQUHAR, of Boston.

Vice-Presidents.

WALTER HUNNEWELL, of Boston.
RICHARD M. SALTONSTALL, of Boston.

Treasurer.

WALTER HUNNEWELL, of Boston.

Secretary.

WILLIAM P. RICH, of Chelsea.*

Trustees.

THOMAS ALLEN, of Boston.
F. LOTHROP AMES, of North Easton.
ERNEST B. DANE, of Brookline.
WILLIAM DOWNS, of Chestnut Hill.
WILLIAM C. ENDICOTT, of Boston.
ARTHUR F. ESTABROOK, of Boston.
NATHANIEL T. KIDDER, of Milton.
THOMAS ROLAND, of Nahant.
CHARLES S. SARGENT, of Brookline.
STEPHEN M. WELD, of Wareham.
WILFRID WHEELER, of Concord.
EDWARD B. WILDER, of Dorchester.

Delegate to the State Board of Agriculture.

EDWARD B. WILDER.

Nominating Committee.

DAVID R. CRAIG
HENRY M. HOWARD
RICHARD HITTINGER
GEORGE PAGE
JOHN L. SMITH

* Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

COMMITTEES FOR 1915.

Finance Committee.

WALTER HUNNEWELL, *Chairman.*
ARTHUR F. ESTABROOK, STEPHEN M. WELD.

Membership Committee.

JOHN K. M. L. FARQUHAR,
WALTER HUNNEWELL, RICHARD M. SALTONSTALL.

Committee on Library.

CHARLES S. SARGENT, *Chairman.*
ERNEST B. DANE, NATHANIEL T. KIDDER.

Committee on Lectures and Publications.

WILFRID WHEELER, *Chairman.*
GEORGE B. DORR, F. C. SEARS.
FRED A. WILSON.

Committee on Prizes and Exhibitions.

JAMES WHEELER, *Chairman.*
DUNCAN FINLAYSON, PETER FISHER, S. J. GODDARD,
T. D. HATFIELD, EDWIN JENKINS,
DR. W. G. KENDALL, EDWARD B. WILDER.

Committee on Plants and Flowers.

T. D. HATFIELD, *Chairman.*
ARTHUR H. FEWKES, DONALD McKENZIE,
JAMES MARLBOROUGH, WILLIAM NICHOLSON,
WILLIAM SIM.

Committee on Fruits.

EDWARD B. WILDER, *Chairman.*
WILLIAM DOWNS, HAROLD L. FROST.
RALPH W. REES.

Committee on Vegetables.

DUNCAN FINLAYSON, *Chairman.*
WILLIAM N. CRAIG, RICHARD HITTINGER,
HENRY M. HOWARD, JOHN L. SMITH.

Committee on Gardens.

JOHN K. M. L. FARQUHAR, *Chairman.*
ROBERT CAMERON, DAVID R. CRAIG, JACKSON T. DAWSON,
ARTHUR H. FEWKES, T. D. HATFIELD, WILLIAM DOWNS.

Committee on Children's Gardens.

HENRY S. ADAMS, *Chairman.*
PHILIP P. CHASE, DR. HARRIS KENNEDY,
MRS. W. RODMAN PEABODY, HARRY S. RAND,
MISS MARGARET A. RAND, WM. P. RICH, JAMES WHEELER.

MEMBERS OF THE MASSACHUSETTS HORTICULTURAL SOCIETY, 1915.

Revised to December 31, 1915.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following lists are inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

1900 Dr. Henry S. Pritchett, Washington, D. C.
1900 Albert Viger, President of the National Society of Horticulture of France, Paris.
1897 Hon. James Wilson, Ex-Secretary of Agriculture, Washington, D. C.

CORRESPONDING MEMBERS.

1901 George Francis Atkinson, Professor of Botany in Cornell University, Ithaca, N. Y.
1889 Dr. L. H. Bailey, Ithaca, N. Y.
1898 John Gilbert Baker, F. R. S., F. L. S., Kew, England.
1875 Professor William J. Beal, Amherst, Mass.
1911 W. J. Bean, Royal Gardens, Kew, England.
1911 John Dunbar, Park Department, Rochester, N. Y.
1887 Sir W. T. Thiselton Dyer, K. C. M. G., F. R. S., "Witcombe," Gloucester, England.
1875 Parker Earle, President of the American Horticultural Society, Roswell, N. M.
1887 H. J. Elwes, F. R. S., Colesborne, Cheltenham, England.

COMMITTEES FOR 1915.

Finance Committee.

WALTER HUNNEWELL, *Chairman.*
ARTHUR F. ESTABROOK, STEPHEN M. WELD.

Membership Committee.

JOHN K. M. L. FARQUHAR,
WALTER HUNNEWELL, RICHARD M. SALTONSTALL.

Committee on Library.

CHARLES S. SARGENT, *Chairman.*
ERNEST B. DANE, NATHANIEL T. KIDDER.

Committee on Lectures and Publications.

WILFRID WHEELER, *Chairman.*
GEORGE B. DORR, F. C. SEARS.
FRED A. WILSON.

Committee on Prizes and Exhibitions.

JAMES WHEELER, *Chairman.*
DUNCAN FINLAYSON, PETER FISHER, S. J. GODDARD,
T. D. HATFIELD, EDWIN JENKINS,
DR. W. G. KENDALL, EDWARD B. WILDER.

Committee on Plants and Flowers.

T. D. HATFIELD, *Chairman.*
ARTHUR H. FEWKES, DONALD McKENZIE,
JAMES MARLBOROUGH, WILLIAM NICHOLSON,
WILLIAM SIM.

Committee on Fruits.

EDWARD B. WILDER, *Chairman.*
WILLIAM DOWNS, HAROLD L. FROST.
RALPH W. REES.

Committee on Vegetables.

DUNCAN FINLAYSON, *Chairman.*
WILLIAM N. CRAIG, RICHARD HITTINGER,
HENRY M. HOWARD, JOHN L. SMITH.

Committee on Gardens.

JOHN K. M. L. FARQUHAR, *Chairman.*
ROBERT CAMERON, DAVID R. CRAIG, JACKSON T. DAWSON,
ARTHUR H. FEWKES, T. D. HATFIELD, WILLIAM DOWNS.

Committee on Children's Gardens.

HENRY S. ADAMS, *Chairman.*
PHILIP P. CHASE, DR. HARRIS KENNEDY,
MRS. W. RODMAN PEABODY, HARRY S. RAND,
MISS MARGARET A. RAND, WM. P. RICH, JAMES WHEELER.

1912 Professor Hugo de Vries, University of Amsterdam, Amsterdam, Holland.
1894 William Watson, Curator of Royal Botanic Gardens, Kew, England.
1906 Miss E. Willmott, Essex, England.
1911 E. H. Wilson, Jamaica Plain, Mass.
1901 Professor L. Wittmack, Secretary of the Royal Prussian Horticultural Society, Berlin, Prussia.

1889 William G. Farlow, M. D., Professor of Cryptogamic Botany, Harvard University, Cambridge.
1893 B. E. Fernow, University of Toronto, Ontario.
1900 Dr. Beverly T. Galloway, Director College of Agriculture, Cornell University, Ithaca, N. Y.
1877 George Lincoln Goodale, M. D., Cambridge, Mass.
1895 Professor Byron D. Halsted, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.
1914 C. S. Harrison, York, Nebraska.
1911 Professor U. P. Hedrick, New York Agricultural Experiment Station, Geneva, N. Y.
1907 Augustine Henry, F. L. S., M. R. I. A., Professor of Forestry, Royal College of Science, Dublin, Ireland.
1897 J. W. Hoffmann, Colored State University, Orangeburg, S. C.
1906 Senor Don Salvador Izquierdo, Santiago, Chile.
1889 Professor William R. Lazenby, Department of Horticulture and Forestry; Secretary College of Agriculture and Domestic Science, Ohio State University, Columbus, O.
1911 Émile Lemoine, Nancy, France.
1875 T. C. Maxwell, Geneva, N. Y.
1911 J. Ewing Mears, M. D., Philadelphia, Pa.
1911 Wilhelm Miller, Superintendent of Horticulture, University of Illinois, Urbana, Illinois.
1898 Sir Frederick W. Moore, Curator of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.
1887 Sir Daniel Morris, C. M. G., D.Sc., M. A., F. L. S.
1898 Peter Nøvik, Secretary of the Norwegian Horticultural Society, Christiania, Norway.
1912 C. Harman Payne, London, England.
1906 Sir David Prain, C. I. E., C. M. G., F. R. S., Director of the Royal Botanic Gardens, Kew, England.
1894 Cavalière Enrico Ragusa, Palermo, Sicily.
1906 Dr. Henry L. Ridley, Kew, England.
1898 Benjamin Lincoln Robinson, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge.
1875 William Robinson, Editor of Gardening Illustrated, London.
1899 William Salway, Superintendent of Spring Grove Cemetery Cincinnati, O.
1875 Robert W. Starr, Wolfville, N. S.
1893 Professor William Trelease, University of Illinois, Urbana, Illinois.
1882 H. J. Veitch, Chelsea, England.
1905 Maurice L. de Vilmorin, Paris, France.
1905 Philippe L. de Vilmorin, Paris, France.

1890 Beebe, Franklin H., Boston.
1905 Bemis, Frank B., Beverly.
1914 Bemis, Mrs. Frank B., Beverly.
1899 Bigelow, Albert S., Cohasset.
1914 Bigelow, Charles, Brookline.
1899 Bigelow, Joseph S., Cohasset.
1899 Bigelow, Dr. William Sturgis, Boston.
1899 Black, George N., Manchester.
1885 Blake, Mrs. Arthur W., Brookline.
1914 Blake, Benjamin S., Auburndale.
1897 Blake, Edward D., Boston.
1908 Blood, Eldredge H., Cambridge.
1905 Boardman, Miss Eliza D., Boston.
1899 Boardman, T. Dennie, Manchester.
1914 Boit, Miss Elizabeth E., Wakefield.
1875 Bolles, William P., M. D., Roxbury.
1894 Bosler, Frank C., Carlisle, Penn.
1914 Bowditch, Alfred, Jamaica Plain.
1887 Bowditch, Charles P., Jamaica Plain.
1897 Bowditch, Ernest W., Milton.
1883 Bowditch, James H., Brookline.
1894 Bowditch, Nathaniel I., Framingham.
1877 Bowditch, William E., Roxbury.
1878 Bowker, William H., Boston.
1913 Brackett, C. Henry B., Boston.
1912 Bradley, Charles H., Boston.
1914 Brandegee, Mrs. Edward D., Brookline.
1900 Breck, Joseph Francis, Waban.
1914 Breck, Luther Adams, Newton.
1899 Bremer, Mrs. John L., Manchester.
1871 Bresee, Albert, Hubbardton, Vt.
1914 Brewer, Edward M., Milton.
1914 Brewer, Joseph, Milton.
1905 Brewster, William, Cambridge.
1910 Briggs, Mrs. George R., Plymouth.
1897 Briggs, William S., Lincoln.
1873 Brigham, William T., Honolulu, Hawaii.
1909 Brooke, Edmund G., Jr., Providence, R. I.
1914 Brooks, Miss Fanny, Readville.
1914 Brooks, Henry G., Milton.
1899 Brooks, Peter C., Boston.
1899 Brooks, Shepherd, Boston.
1912 Brooks, Walter D., Milton.
1909 Brown, Mrs. John Carter, Providence, R. I.
1899 Brown, Samuel N., Boston.
1907 Brush, Charles N., Brookline.
1915 Buckminster, W. B., Malden.
1906 Buitta, Vincent, Newton Upper Falls.
1914 Bullard, Alfred M., Milton.
1897 Burlen, William H., East Holliston.
1895 Burnett, Harry, Southborough.
1911 Burnett, John T., Southborough.
1914 Burnett, Robert M., Southborough.
1914 Burnham, Miss Helen C., Boston.
1909 Burr, I. Tucker, Milton.
1906 Burrage, Albert C., Boston.
1868 Butler, Aaron, Wakefield.
1907 Butterworth, George William, South Framingham.
1906 Butterworth, J. Thomas, South Framingham.
1905 Buttrick, Stedman, Concord.

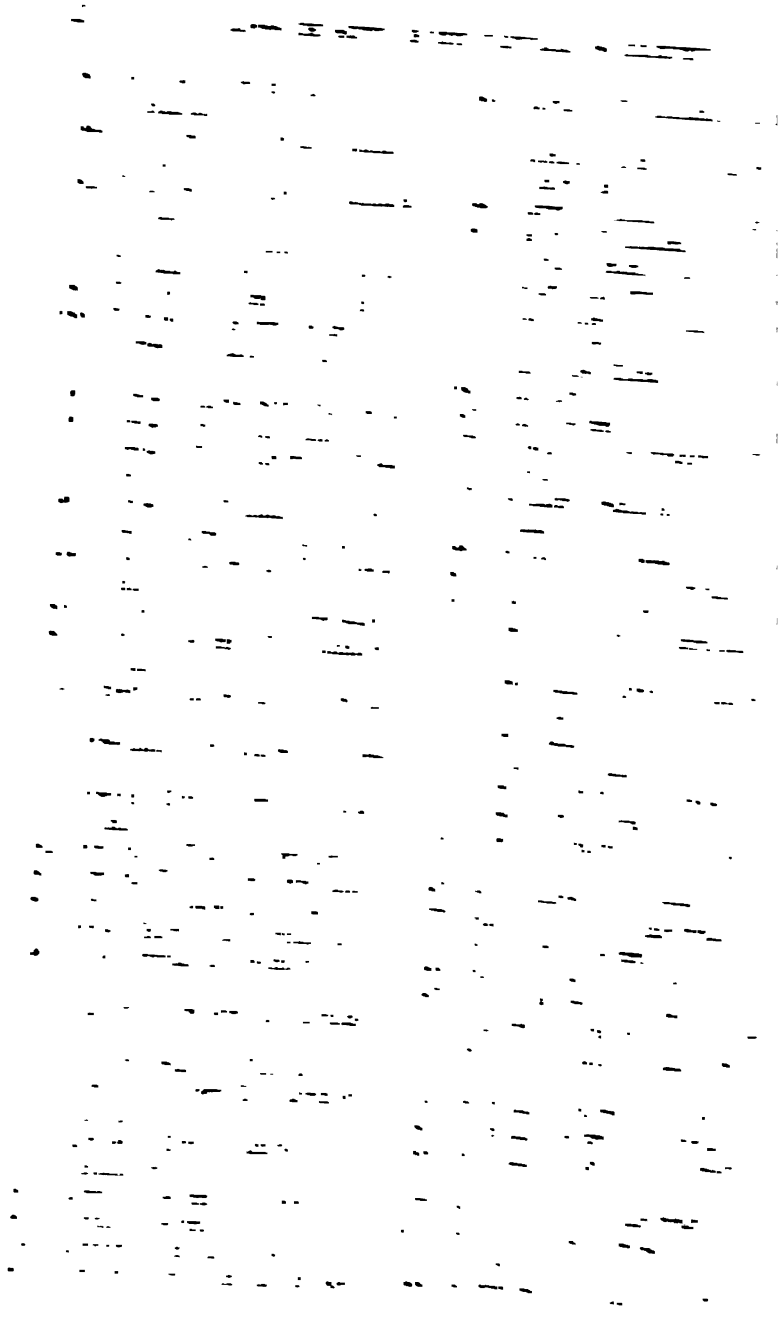
1902 Cabot, George E., Boston.
1914 Cabot, Henry B., Brookline.
1870 Calder, Augustus P., Brookline.
1896 Cameron, Robert, Cambridge.
1908 Campbell, Charles A., Ipswich.
1913 Campbell, Chester I., Wollaston.
1891 Campbell, Francis, Cambridge.
1905 Carr, Samuel, Boston.

LIFE MEMBERS.

1899 Adams, Mrs. Charles Francis, South Lincoln.
1907 Adams, George E., Kingston, R. I.
1897 Adams, Henry Saxton, Jamaica Plain.
1899 Agassiz, Mrs. George R., Yarmouth Port.
1894 Allen, Hon. Charles H., Lowell.
1898 Allen, Thomas, Boston.
1899 Ames, F. Lothrop, North Easton.
1914 Ames, Mrs. F. L., North Easton.
1899 Ames, John S., North Easton.
1899 Ames, Miss Mary S., North Easton.
1894 Ames, Oakes, North Easton.
1899 Ames, Oliver, North Easton.
1900 Ames, Mrs. Oliver, Sr., North Easton.
1867 Amory, Frederic, Boston.
1899 Anderson, Larz, Brookline.
1911 Anderson, William, South Lancaster.
1864 Andrews, Charles L., Milton.
1871 Appleton, Hon. Francis H., Boston.
1914 Appleton, Francis R., New York, N. Y.
1913 Appleton, Henry Saltonstall, Boston.
1914 Apthorp, Mrs. Harrison O., Milton.
1900 Arnold, Mrs. George Francis, Brookline.
1894 Ash, John, Pomfret Centre, Conn.
1890 Atkins, Edwin F., Belmont.
1914 Ayer, Mrs. Frederick, Boston.
1899 Ayer, James B., Boston.

1912 Bache, James S., Sharon, Conn.
1905 Backer, Clarence A., Melrose.
1914 Bacon, Miss E. S., Jamaica Plain.
1905 Badger, Walter I., Cambridge.
1894 Bailey, Jason S., West Roxbury.
1902 Bailey, Robert M., Dedham.
1902 Baker, Clifton P., Dedham.
1901 Baker, James E., South Lincoln.
1904 Balch, Joseph, Dedham.
1909 Baldwin, Frank F., Hopkinton.
1888 Barber, J. Wesley, Newton.
1904 Barker, George, Swampscott.
1905 Barnard. George E., Ipswich.
1866 Barnes, Walter S., Boston.
1904 Barney, Arthur F., Dorchester.
1867 Barney, Levi C., Boston.
1897 Barry, John Marshall, Boston.
1893 Barry, William C., Rochester, N. Y.
1901 Bartlett, Miss Mary F., Boston.
1914 Bartol, Dr. John W., Boston.
1915 Bartsch, Hermann H., Waverly.
1901 Bates, Miss Mary D., Ipswich.
1915 Bauernfeind, John, Medford.
1899 Baylies, Walter C., Taunton.
1914 Beal, Mrs. Boylston, Boston.
1905 Beal, Thomas P., Boston.
1891 Becker, Frederick C., Cambridge.
1876 Beckford, Daniel R., Jr., Dedham.
1894 Beebe, E. Pierson, Boston.

1902 Davis, Arthur E., Dover.
1902 Davis, Mrs. Arthur E., Dover.
1913 Davis, Bancroft Chandler, Weston.
1914 Davis, Livingston, Milton.
1909 Dawson, Henry Sargent, Jamaica Plain.
1872 Dawson, Jackson T., Jamaica Plain.
1905 Day, Henry B., West Newton.
1873 Denny, Clarence H., Boston.
1904 Dexter, Gordon, Beverly Farms.
1904 Dexter, Philip, Beverly.
1866 Dike, Charles C., Stoneham.
1902 Doane, Edgar Howard, Wenham.
1896 Donald, William, Cold Spring Harbor, N. Y.
1900 Donaldson, James, Roxbury.
1907 Doten, Scott T., Jamaica Plain.
1914 Douglass, Alfred, Brookline.
1910 Downs, William, Chestnut Hill.
1893 Dowse, William B. H., West Newton.
1899 Draper, George A., Hopedale.
1896 Dreer, William F., Philadelphia, Pa.
1897 Dumaresq, Herbert, Chestnut Hill.
1899 Duncan, James L., New York, N. Y.
1902 Duncan, John W., Spokane, Wash.
1896 Dunlap, James H., Nashua, N. H.
1915 Dunn, Stephen Troyte, F. L. S., F. R. G. S., Kew, England.
1915 Dupee, William Arthur, Milton.
1909 Dupuy, Louis, Whitestone, L. I., N. Y.
1852 Durfee, George B., Fall River.
1880 Dutcher, Frank J., Hopedale.
1900 Dwight, Theodore F., Kendal Green.
1902 Dyer, Herbert H., Arlington.
1912 Eaton, Harris D., Southborough.
1911 Edgar, Mrs. Rose H., Waverley.
1912 Edgar, William Percival, Jamaica Plain.
1895 Eldredge, H. Fisher, Boston.
1887 Elliott, Mrs. John W., Boston.
1888 Elliott, William H., Brighton.
1903 Ellsworth, J. Lewis, Worcester.
1907 Emerson, Nathaniel W., M.D., Boston.
1894 Endicott, William, Boston.
1899 Endicott, William C., Danvers.
1915 Ernst, Mrs. Harold C., Jamaica Plain.
1897 Estabrook, Arthur F., Boston.
1905 Estabrook, Mrs. Arthur F., Boston.
1907 Eustis, Miss Elizabeth M., Brookline.
1907 Eustis, Miss Mary St. Barbe, Brookline.
1914 Evans, Mrs. Robert D., Boston.
1915 Fairbanks, Charles F., Milton.
1881 Fairchild, Charles, New York, N. Y.
1877 Falconer, William, Pittsburg, Pa.
1884 Farlow, Lewis H., Boston.
1896 Farnsworth, Mrs. William, Dedham.
1890 Farquhar, James F. M., Roslindale.
1891 Farquhar, John K. M. L., Roxbury.
1915 Farquhar, Mrs. John K. M. L., Roxbury.
1884 Farquhar, Robert, North Cambridge.
1873 Faxon, John, Quincy.
1899 Fay, H. H., Woods Hole.
1915 Fay, Mrs. Harry F., Lexington.
1908 Fay, Wilton B., West Medford.
1914 Fearing, George R., Jr., Boston.
1899 Fessenden, George B., Allston.



1887 Harris, Thaddeus William, A. M., Littleton, N. H.
1910 Harris, Prof. William Fenwick, Cambridge.
1909 Hart, Francis R., Milton.
1899 Hartshorn, Arthur E., Worcester.
1914 Hartt, Arthur W., Brookline.
1895 Harwood, George Fred, Newton.
1884 Hastings, Levi W., Brookline.
1906 Hauthaway, Edwin D., Sharon.
1914 Havemeyer, Theodore A., New York, N. Y.
1891 Hawken, Mrs. Thomas, Rockland, Me.
1899 Hayward, George P., Chestnut Hill.
1914 Haywood, H. T., Franklin.
1905 Head, Thomas W., Lake Forest, Ill.
1913 Heeremans, F., Lenox.
1903 Hellier, Charles E., Boston.
1888 Hemenway, Augustus, Canton.
1899 Hemenway, Mrs. Augustus, Canton.
1914 Hemenway, Augustus, Jr., Boston.
1884 Henshaw, Joseph P. B., Boston.
1899 Henshaw, Samuel, Cambridge.
1901 Heurlin, Julius, South Braintree.
1894 Hewett, Miss Mary Crane, Cambridge.
1900 Higginson, Francis L., Boston.
1902 Higginson, Mrs. Henry L., Boston.
1866 Hilbourn, A. J. Boston.
1886 Hittinger, Jacob, Belmont.
1911 Hittinger, Richard, Belmont.
1895 Hoitt, Hon. Charles W., Nashua, N. H.
1905 Holbrook, E. Everett, Boston.
1914 Hollingsworth, Valentine, Boston.
1899 Hollingsworth, Z. T., Boston.
1881 Hollis, George W., Allston.
1891 Holmes, Edward J., Boston.
1876 Holt, Mrs. Stephen A., Cambridge.
1900 Holt, William W., Norway, Maine.
1899 Hood, The Hon. Mrs. Ellen, Sheen, Surrey, Eng.
1899 Hooper, William, Manchester.
1913 Hopewell, John, Newton.
1914 Hornblower, Henry, Boston.
1888 Horsford, Miss Kate, Cambridge.
1912 Horton, Arthur E., Lexington.
1902 Hosmer, Oscar, Wenham.
1907 Houghton, Clement S., Chestnut Hill.
1910 Houghton, Miss Elizabeth G., Boston.
1872 Hovey, Charles H., South Pasadena, Cal.
1884 Hovey, Stillman S., Woburn.
1904 Howard, Henry M., West Newton.
1896 Howard, Joseph W., Somerville.
1915 Howes, Mrs. Ernest, Boston.
1905 Hoyt, William J., Manchester, N. H.
1896 Hubbard, Charles Wells, Weston.
1865 Hubbard, James C., Everett.
1913 Huebner, H., Groton.
1875 Humphrey, George W., Dedham.
1912 Hunnewell, F. W., 2d., Wellesley.
1893 Hunnewell, Henry Sargent, Wellesley.
1912 Hunnewell, Mrs. Henry S., Wellesley.
1882 Hunnewell, Walter, Wellesley.
1912 Hunnewell, Walter, Jr., Wellesley.
1892 Hunt, Dudley F., Reading.
1866 Hunt, Franklin, Charlestown, N. H.
1880 Hunt, William H., Concord.

1883 Fewkes, Arthur H., Newton Highlands.
1904 Finlayson, Duncan, Jamaica Plain.
1892 Finlayson, Kenneth, Jamaica Plain
1901 Fisher, Peter, Ellis.
1910 Flanagan, Joseph F., Newton.
1882 Fletcher, George V., Belmont.
1883 Fletcher J. Henry, Belmont.
1914 Forbes, Alexander, M.D., Milton.
1909 Forbes, Charles Stewart, Boston.
1909 Forbes, Mrs. J. Malcolm, Milton.
1914 Forbes, W. Cameron, Westwood.
1909 Forbes, Mrs. William H., Milton.
1914 Foster, Alfred D., Milton.
1899 Foster, Charles H. W., Needham.
1885 Fottler, John, Jr., Dorchester.
1881 Fowle, George W., Jamaica Plain.
1914 Fraser, Charles E. K., South Natick.
1911 Freeman, Mrs. James G., Boston.
1910 French, Mrs. Albert M., Reading.
1892 French, S. Waldo, Newtonville.
1893 French, W. Clifford, Brookline.
1882 Frohock, Roscoe R., Boston.
1903 Frost, Harold L., Arlington.
1900 Frost, Irving B., Belmont.

1910 Galloupe, Frederic R., Lexington.
1914 Gannett, Samuel, Milton.
1914 Gardiner, Robert H., Gardiner, Maine.
1901 Gardner, Mrs. Augustus P., Hamilton.
1895 Gardner, George A., Boston.
1895 Gardner, George P., Boston.
1899 Gardner, John L., Boston.
1899 Gardner, Mrs. John L., Brookline.
1899 Gardner, William Amory, Groton.
1910 Garland, Mrs. Marie T., Buzzards Bay.
1904 Garratt, Allan V., Holliston.
1899 Gaston, William A. Boston.
1911 Gavin, Frank D., Manchester.
1910 Geiger, Albert, Jr., Brookline.
1911 Gill, Miss Adeline Bradbury, Medford.
1911 Gill, Miss Eliza M., Medford.
1865 Gill, Mrs. E. M.. Medford.
1887 Gill, George B., Medford.
1870 Gilson, F. Howard, Wellesley Hills.
1907 Goddard, Samuel J., Framingham.
1904 Goodale, Dr. Joseph L., Boston.
1885 Goodell, L. W., Dwight.
1899 Gray, Mrs. John C., Boston
1914 Greene, Edwin Farnham, Boston.
1905 Greenough, Mrs. Charles P., Brookline.
1912 Greenough, Mrs. David S., Jamaica Plain.
1899 Grew, Edward S., Boston.
1914 Grew, Mrs. Edward S., Boston.
1914 Grew, Edward W., Boston.

1897 Hale, James O., Byfield.
1873 Hall, Edwin A., Cambridgeport.
1912 Hall, Mrs. George G., Boston.
1899 Hall, Jackson E., Foxboro.
1897 Hall, Osborn B., Malden.
1910 Halloran, Edward J., Roxbury.
1913 Handler, Max Paul, South Natick.
1914 Harding, Charles L., Dedham.
1863 Harding, George W., Arlington.
1869 Harding, Louis B., Chestnut Hill.
1871 Hardy, F. D., Cambridgeport.
1905 Hardy, Miss Susan White, Boston.
1889 Hargraves, William J., Jamaica Plain.

1887 Harris, Thaddeus William, A. M., Littleton, N. H.
1910 Harris, Prof. William Fenwick, Cambridge.
1909 Hart, Francis R., Milton.
1899 Hartshorn, Arthur E., Worcester.
1914 Hartt, Arthur W., Brookline.
1895 Harwood, George Fred, Newton.
1884 Hastings, Levi W., Brookline.
1906 Hauthaway, Edwin D., Sharon.
1914 Havemeyer, Theodore A., New York, N. Y.
1891 Hawken, Mrs. Thomas, Rockland, Me.
1899 Hayward, George P., Chestnut Hill.
1914 Haywood, H. T., Franklin.
1905 Head, Thomas W., Lake Forest, Ill.
1913 Heeremans, F., Lenox.
1903 Hellier, Charles E., Boston.
1888 Hemenway, Augustus, Canton.
1899 Hemenway, Mrs. Augustus, Canton.
1914 Hemenway, Augustus, Jr., Boston.
1884 Henshaw, Joseph P. B., Boston.
1899 Henshaw, Samuel, Cambridge.
1901 Heurlin, Julius, South Braintree.
1894 Hewett, Miss Mary Crane, Cambridge.
1900 Higginson, Francis L., Boston.
1902 Higginson, Mrs. Henry L., Boston.
1866 Hilbourn, A. J. Boston.
1886 Hittinger, Jacob, Belmont.
1911 Hittinger, Richard, Belmont.
1895 Hoitt, Hon. Charles W., Nashua, N. H.
1905 Holbrook, E. Everett, Boston.
1914 Hollingsworth, Valentine, Boston.
1899 Hollingsworth, Z. T., Boston.
1881 Hollis, George W., Allston.
1891 Holmes, Edward J., Boston.
1876 Holt, Mrs. Stephen A., Cambridge.
1900 Holt, William W., Norway, Maine.
1899 Hood, The Hon. Mrs. Ellen, Sheen, Surrey, Eng.
1899 Hooper, William, Manchester.
1913 Hopewell, John, Newton.
1914 Hornblower, Henry, Boston.
1888 Horsford, Miss Kate, Cambridge.
1912 Horton, Arthur E., Lexington.
1902 Hosmer, Oscar, Wenham.
1907 Houghton, Clement S., Chestnut Hill.
1910 Houghton, Miss Elizabeth G., Boston.
1872 Hovey, Charles H., South Pasadena, Cal.
1884 Hovey, Stillman S., Woburn.
1904 Howard, Henry M., West Newton.
1896 Howard, Joseph W., Somerville.
1915 Howes, Mrs. Ernest, Boston.
1905 Hoyt, William J., Manchester, N. H.
1896 Hubbard, Charles Wells, Weston.
1865 Hubbard, James C., Everett.
1913 Huebner, H., Groton.
1875 Humphrey, George W., Dedham.
1912 Hunnewell, F. W., 2d., Wellesley.
1893 Hunnewell, Henry Sargent, Wellesley.
1912 Hunnewell, Mrs. Henry S., Wellesley.
1882 Hunnewell, Walter, Wellesley.
1912 Hunnewell, Walter, Jr., Wellesley.
1892 Hunt, Dudley F., Reading.
1866 Hunt, Franklin, Charlestown, N. H.
1880 Hunt, William H., Concord.

1904 Hutchins, Rev. Charles Lewis, Concord.

1893 Jack, John George, East Walpole.
1886 Jackson, Charles L., Boston.
1914 Jackson, Mrs. James, Jr., Westwood.
1884 Jackson, Robert T., Cambridge.
1902 James, Ellerton, Milton.
1902 James, Mrs. Ellerton, Milton.
1899 James, George Abbot, Nahant.
1910 Jaques, Herbert, Chestnut Hill.
1913 Jeffries, John Temple L., Cambridge.
1899 Jeffries, William A., Boston.
1865 Jenks, Charles W., Bedford.
1905 Johnson, Arthur S., Boston.
1914 Johnson, Edward C., Boston.
1885 Johnson, J. Frank, Malden.
1907 Jones, Mrs. Clarence W., Brookline.
1896 Jones, Jerome, Brookline.
1897 Jones, Dr. Mary E., Boston.
1899 Jordan, Eben D., Boston.
1900 Jordan, Henry G., Hingham Centre.

1897 Kellen, William V., Marion.
1886 Kelly, George B., Jamaica Plain.
1848 Kendall, D. S., Woodstock, Ont.
1891 Kendall, Dr. Walter G., Atlantic.
1868 Kennedy, George G., M. D., Milton.
1909 Kennedy, Harris, M. D., Milton.
1905 Keyes, Mrs. Emma Mayer, Boston.
1891 Keyes, John M., Concord.
1889 Kidder, Charles A., Southborough.
1910 Kidder, Mrs. Henry P., Boston.
1880 Kidder, Nathaniel T., Milton.
1899 Kimball, David P., Boston.
1903 Kimball, Richard D., Waban.
1899 King, D. Webster, Boston.
1865 Kingman, Abner A., Wakefield.
1899 Kinney, H. R., Worcester.
1906 Kinnicutt, Mrs. Leonard P., Worcester.
1904 Kirkland, Archie Howard, Reading.

1899 Lamb, Horatio A., Milton.
1913 Lancaster, Dr. Walter B., Brookline.
1899 Lanier, Charles, Lenox.
1895 Lawrence, Amos A., New York, N. Y.
1873 Lawrence, John, Groton.
1899 Lawrence, Rt. Rev. William, Boston.
1895 Lee, Daniel D., Jamaica Plain.
1914 Lee, George C., Westwood.
1914 Lee, Mrs. George C., Westwood.
1880 Leeson, Hon. Joseph R., Newton Centre.
1902 Leighton, George B., Monadnock, N. H.
1914 Leland, Lester, Boston.
1914 Leland, Mrs. Lester, Boston.
1871 Lemme, Frederick, Charlestown.
1903 Libby, Charles W., Medford.
1904 Lindsey, N. Allen, Marblehead.
1899 Little, John Mason, Swampscott.
1899 Locke, Isaac H., Belmont.
1891 Lodge, Richard W., Redlands, Cal.
1897 Loomis, Elihu G., Bedford.
1899 Loring, Augustus P., Beverly.
1905 Loring, David, Boston.
1914 Loring, Miss Katharine P., Prides Crossing.
1914 Loring, Miss Louisa P., Prides Crossing.
1899 Loring, Mrs. William Caleb, Beverly.
1899 Lowell, Abbott Lawrence, Boston.
1902 Lowell, Miss Amy, Brookline.

1903 Lowell, James A., Chestnut Hill.
1903 Lowell, John, Newton.
1904 Lowell, Miss Lucy, Boston.
1899 Luke, Otis H., Brookline.
1895 Lunt, William W., Hingham.
1914 Lyman, C. Frederic, Boston.
1895 Lyman, George H., Wareham.

1898 Mabbett, George, Plymouth.
1912 McKay, Alexander, Jamaica Plain.
1911 McKenzie, Donald, Chestnut Hill.
1868 Mahoney, John, Boston.
1892 Mallett, E. B., Jr., Freeport, Me.
1884 Manda, W. A., South Orange, N. J.
1906 Mandell, Mrs. William D., Boston.
1873 Mann, James F., Ipswich.
1887 Manning, J. Woodward, Reading.
1884 Manning, Warren H., Brookline.
1909 Marlborough, James, Topsfield.
1913 Marshall, A. A., Fitchburg.
1876 Marshall, Frederick F., Everett.
1898 Marston, Howard, Brookline.
1899 Mason, Miss Ellen F., Boston.
1896 Mason, Col. Frederick, Taunton.
1914 Mathews, Miss Elizabeth Ashby, Newton Center.
1901 Matthews, Nathan, Boston.
1906 Maxwell, George H., Newton.
1902 Melvin, George, South Framingham.
1905 Meredith, J. Morris, Topsfield.
1881 Merriam, Herbert, Weston.
1884 Metivier, James, Waltham.
1914 Meyer, George von L., Hamilton.
1914 Mifflin, George H., Boston.
1914 Miller, Peter M., Mattapan.
1888 Milmore, Mrs. Joseph, Washington, D. C.
1915 Minot, Mrs. Charles S., Readville.
1908 Miont, Laurence, Boston.
1892 Monteith, David, Hyde Park, Vt.
1896 Montgomery, Alexander, Natick.
1902 Montgomery, Alexander, Jr., Natick.
1896 Moore, George D., Arlington.
1881 Moore, John H., Concord.
1897 Morgan, George H., New York, N. Y.
1914 Morgan, Mrs. J. P., New York, N. Y.
1913 Morison, Robert S., Cambridge.
1912 Morris, George E., Waltham.
1899 Morse, John T., Boston.
1909 Morse, John Torrey, 3d., Boston.
1910 Morse, Lewis Kennedy, Boxford.
1913 Morse, Robert C., Milton.
1900 Morse, Robert M., Jamaica Plain.
1914 Morss, Charles A., Chestnut Hill.
1914 Morss, Mrs. Charles A., Chestnut Hill.
1902 Morton, James H., Huntington, N. Y.
1896 Moseley, Charles H., Roxbury.
1909 Moseley, Charles W., Newburyport.
1896 Moseley, Frederick Strong, Newburyport.
1914 Munroe, Howard M., Lexington.
1900 Murray, Peter, Fairhaven.
1897 Mutch, John, Waban.

1899 Nevins, Mrs. David, Methuen.
1914 Newbold, Frederic R., New York, N. Y.
1874 Newman, John R., Winchester.
1874 Newton, Rev. William W., Pittsfield.

1914 Nicholson, William R., Framingham.
1906 Nickerson, William E., Cambridge.
1914 Norman, Mrs. Louisa P., Newport, R. I.
1881 Norton, Charles W., Allston.
1891 Norton, Edward E., Boston.

1912 O'Conner, John, Brookline.
1898 Olmsted, Frederick Law, Jr., Brookline.
1892 Olmsted, John C., Brookline.
1898 Orpet, Edward O., Lake Forest, Ill.

1909 Page, George, Newton Highlands.
1909 Page, George William, East Billerica.
1900 Page, Mrs. Henrietta, Cambridge.
1884 Paige, Clifton H., Mattapan.
1914 Paine, Robert Treat, 2d, Boston.
1908 Parker, Augustine H., Dover.
1913 Parker, Edgar, North Easton.
1911 Parker, Edward, North Easton.
1915 Parker, Miss Eleanor S., Bedford.
1891 Parkman, Henry, Boston.
1899 Parsons, John E., Lenox.
1914 Patten, Miss Jane B., South Natick.
1897 Patten, Marcellus A., Tewksbury.
1909 Peabody, Francis, Milton.
1909 Peabody, Mrs. Francis, Milton.
1905 Peabody, Frank E., Boston.
1899 Peabody, George A., Danvers.
1881 Peabody, John E., Salem.
1871 Peck, William G., Arlington.
1907 Peirce, E. Allan, Waltham.
1914 Peirson, Charles Lawrence, Boston.
1915 Penn, Henry, Brookline.
1899 Pentecost, Mrs. Ernest Harvey, Topsfield.
1873 Perry, George W., Malden.
1899 Pfaff, Col. Charles, South Framingham.
1900 Phillips, John C., North Beverly.
1899 Phillips, Mrs. John C., North Beverly.
1899 Phillips, William, North Beverly.
1895 Pickman, Dudley L., Boston.
1902 Pickman, Mrs. Ellen R., Boston.
1881 Pierce, Dean, Brookline.
1892 Pierce, George Francis, Neponset.
1905 Pierce, Wallace L., Boston.
1905 Pierson, Frank R., Tarrytown, N. Y.
1914 Pingree, David, Salem.
1900 Pond, Preston, Winchester.
1892 Porter, James C., Wollaston.
1884 Pratt, Laban, Dorchester.
1868 Pratt, Robert M., Boston.
1914 Pratt, Waldo E., Wellesley Hills.
1898 Pray, James Sturgis, Cambridge.
1858 Prescott, Eben C., New York, N. Y.
1914 Preston, Andrew W., Swampscott.
1903 Preston, Howard Willis, Providence, R. I.
1911 Priest, Lyman F., Gleasondale.
1912 Proctor, Henry H., Boston.
1901 Proctor, Thomas E., Boston.
1899 Putnam, George, Manchester.
1900 Putnam, George J., Brookline.

1886 Quimby, Hosea M., M. D., Worcester.

1891 Raddin, Everett W., North Cambridge.
1889 Rand, Harry S., North Cambridge.

1908 Rand, Miss Margaret A., Cambridge.
1903 Rawson, Herbert W., Arlington.
1882 Ray, James F., Franklin.
1890 Raymond, Walter, Pasadena, Cal.
1891 Read, Charles A., Manchester.
1902 Reardon, Edmund, Cambridgeport.
1892 Reardon, John B., Boston.
1912 Reiff, William, Forest Hills.
1905 Remick, Frank W., West Newton.
1889 Rice, George C., Worcester.
1887 Rich, William P., Chelsea.
1876 Richards, John J., Brookline.
1899 Richardson, Mrs. F. L. W., Charles River Village.
1912 Richardson, H. H., Brookline.
1900 Richardson, Dr. William L., Boston.
1905 Riggs, William Allan, Auburndale.
1886 Ripley, Charles, Dorchester.
1892 Ripley, Ebed L., Hingham Centre.
1903 Robb, Russell, Concord.
1909 Roberts, Miss Anna B., Boston.
1909 Robinson, Alfred E., Lexington.
1871 Robinson, John, Salem.
1900 Rodman, Miss Mary, Concord.
1903 Roffe, Albert H., Newton Centre.
1911 Rogers, Dexter M., Allston.
1914 Rogers, Dudley P., Danvers.
1899 Rogers, Mrs. Jacob C., Peabody.
1900 Roland, Thomas, Nahant.
1910 Ross, Harold S., Hingham.
1895 Rothwell, James E., Brookline.
1899 Roy, David Frank, Marion.
1881 Ruddick, William H., M. D., South Boston.
1875 Russell, George, Woburn.
1914 Russell, Mrs. Henry S., Boston.
1900 Russell, James S., Milton.
1914 Russell, Mrs. Robert S., Boston.

1893 Salisbury, William C. G., Brookline.
1915 Saltonstall, Mrs. Caroline S., Milton.
1912 Saltonstall, John L., Beverly.
1912 Saltonstall, Mrs. John L., Beverly.
1899 Saltonstall, Richard M., Chestnut Hill.
1898 Sanger, Mrs. George P., Boston.
1900 Sargent, Andrew Robeson, Brookline.
1870 Sargent, Charles S., Brookline.
1899 Sargent, Mrs. Charles S., Brookline.
1902 Sargent, Charles Sprague, Jr., Brookline.
1899 Sargent, Mrs. Francis W., Wellesley.
1896 Scorgie, James C., Cambridge.
1864 Scott, Charles, Newton.
1895 Sears, Miss Clara E., Boston.
1899 Sears, Dr. Henry F., Boston.
1914 Sears, Horace S., Weston.
1899 Sears, Mrs. J. Montgomery, Boston.
1898 Sharp, Miss Helen, Boston.
1914 Shattuck, Dr. Frederick C., Boston.
1914 Shattuck, Mrs. Frederick C., Boston.
1899 Shaw, Francis, Wayland.
1914 Shaw, Henry S., Milton.
1899 Shaw, Mrs. Robert G., Wellesley.
1901 Shea, James B., Jamaica Plain.
1906 Sherman, J. P. R., Newton.
1865 Shorey, John L., Lynn.
1892 Shuman, Hon. A., Boston.
1901 Shurtleff, Josiah B., Jr., Revere.
1893 Siebrecht, H. A., New Rochelle, N. Y.

1899 Sleeper, Henry Davis, Boston.
1903 Smiley, Daniel, Lake Mohonk, N. Y.
1888 Smith, Charles S., Lincoln.
1872 Smith, Edward N., San Francisco, Cal.
1911 Smith, John L., Swampscott.
1888 Smith, Thomas Page, Waltham.
1874 Snow, Eugene A., Cambridge.
1899 Sohier, Col. William D., Beverly.
1864 Spaulding, Edward, Weston.
1908 Spaulding, John T., Prides Crossing.
1908 Spaulding, William S., Prides Crossing.
1897 Sprague, Isaac, Wellesley Hills.
1884 Stearns, Charles H., Brookline.
1893 Stearns, Frank W., Newton.
1896 Stedman, Henry R., M. D., Brookline.
1914 Stevens, Mrs. Nathaniel, North Andover.
1885 Stewart, William J., Winchester.
1901 Stone, Charles A., Newton.
1889 Stone, Charles W., Boston.
1910 Stone, Mrs. Francis H., South Dartmouth.
1914 Stone, Galen L., Brookline.
1896 Stone, Prof. George E., Amherst.
1849 Stone, George F., Chestnut Hill.
1914 Stone, J. Winthrop, Watertown.
1914 Stone, Nathaniel H., Milton.
1905 Storrow, James J., Boston.
1905 Stratton, Charles E., Boston.
1906 Strout, Charles S., Biddeford, Me.
1914 Sturgis, Miss Evelyn R., Manchester.
1902 Sturgis, Richard Clipston, Boston.
1910 Sullivan, Martin, Jamaica Plain.
1912 Swan, Charles H., Jamaica Plain.
1891 Sweet, Everell F., Malden.
1904 Sylvester, Edmund Q., Hanover.

1899 Taylor, Charles H., Boston.
1900 Taylor, Mrs. Thomas, Jr., Columbia, S. C.
1913 Tedcastle, Mrs. Arthur W., Hyde Park.
1896 Tenney, Charles H., Methuen.
1912 Thatcher, Arthur E., Bar Harbor, Me.
1898 Thatcher, William, Brookline.
1899 Thayer, Mrs. Alice R., Boston.
1900 Thayer, Bayard, South Lancaster.
1900 Thayer, Mrs. Bayard, South Lancaster.
1899 Thayer, Mrs. Eugene V. R., South Lancaster.
1903 Thayer, Henry J., Boston.
1899 Thayer, John E., South Lancaster.
1899 Thayer, Mrs. John E., South Lancaster.
1899 Thayer, Mrs. Nathaniel, Lancaster.
1899 Thiemann, Hermann, Owosso, Mich.
1899 Thomas, W. B., Manchester.
1910 Thurlow, George C., West Newbury.
1913 Thurlow, Winthrop H., West Newbury.
1874 Tolman, Miss Harriet S., Boston.
1896 Toppan, Roland W., Malden.
1864 Torrey, Everett, Charlestown.
1899 Tower, Miss Ellen May, Lexington.
1901 Tower, Mrs. Helen M., Cambridge.
1914 Towle, L. D., Newton.
1893 Trepess, Samuel J., Glencove, L. I., N. Y.
1910 Turner, Chester Bidwell, Stoughton.

1914 Tyler, Charles H., Boston.

1910 Underwood, Henry O., Belmont.
1901 Underwood, Loring, Belmont.

1873 Vander-Woerd, Charles, Waltham.
1899 Vaughan, William Warren, Boston.
1884 Vinal, Miss Mary L., Somerville.

1909 Wainwright, Arthur, Milton.
1849 Wakefield, E. H., Cambridge.
1876 Walcott, Henry P., M. D., Cambridge.
1895 Waldo, C. Sidney, Jamaica Plain.
1914 Walker, William B., Manchester.
1896 Walsh, Michael H., Woods Hole.
1901 Waltham, George C., Dorchester.
1907 Walton, Arthur G., Wakefield.
1902 Warburton, Chatterton, Fall River.
1912 Wardwell, Mrs. T. Otis, Haverhill.
1894 Ware, Miss Mary L., Boston.
1909 Warren, Bentley W., Boston.
1889 Watson, Benjamin M., Jamaica Plain.
1884 Watson, Thomas A., East Braintree.
1914 Watters, W. F., Boston.
1905 Webster, Edwin S., Chestnut Hill.
1914 Webster, Mrs. Edwin S., Chestnut Hill.
1905 Webster, Frank G., Boston.
1907 Webster, George H., Haverhill.
1896 Webster, Hollis, Cambridge.
1905 Webster, Laurence J., Holderness, N. H.
1909 Weeks, Andrew Gray, Marion.
1901 Welch, David, Dorchester.
1902 Welch, Edward J., Dorchester.
1914 Weld, Mrs. Charles G., Brookline.
1884 Weld, Christopher Minot, Readville.
1899 Weld, Gen. Stephen M., Wareham.
1914 Weld, Mrs. Stephen M., Wareham.
1912 Wellington, Mrs. Arthur W., Boston.
1882 West, Mrs. Maria L., Neponset.
1887 Wheeler, Frank, Concord.
1889 Wheeler, James, Natick.
1897 Wheeler, Wilfrid, Concord.
1865 Whitcomb, William B., Medford.
1901 White, Mrs. Charles T., Boston.
1865 White, Francis A., Brookline.
1899 White, George R., Boston.
1909 White, Harry K., Milton.
1905 Whitman, William, Brookline.
1894 Whitney, Arthur E., Winchester.
1894 Whitney, Ellerton P., Milton.
1899 Whitney, Henry M., Cohasset.
1915 Wigglesworth, Frank, Milton.
1899 Wigglesworth, George, Milton.
1863 Wilbur, George B., Boston.
1889 Wilde, Mrs. Albion D., West Roxbury.
1881 Wilder, Edward Baker, Dorchester.
1899 Williams, Miss Adelia Coffin, Roxbury.
1905 Williams, George Percy, Boston.
1899 Williams, John Davis, Boston.
1905 Williams, Mrs. J. Bertram, Cambridge.
1905 Williams, Mrs. Moses, Brookline.
1871 Williams, Philander, Taunton.

1911 Williams, Ralph B., Dover.
1915 Wilson, E. H., Jamaica Plain.
1914 Wilson, Fred A., Nahant.
1881 Wilson, William Power, Boston.
1905 Winsor, Robert, Weston.
1906 Winter, Herman L., Portland, Me.
1914 Winthrop, Greenville L., Lenox.
1914 Winthrop, Mrs. Robert, New York, N. Y.
1914 Winthrop, Mrs. Robert C., Jr., Boston.
1870 Wood, William K., Franklin.
1905 Woodberry, Miss E. Gertrude, North Cambridge.
1905 Woodbury, John, Canton.
1906 Woodward, Mrs. Samuel Bayard, Worcester.
1900 Wyman, Windsor H., North Abington.

ANNUAL MEMBERS.

1913 Adams, Charles F., Jamaica Plain.
1905 Allen, Mrs. Sarah R., Wilmington.
1896 Anderson, George M., Milton.

1912 Babcock, Miss Mabel Keyes, Wellesley Hills.
1911 Bacon, Augustus, Roxbury.
1915 Baker, Mrs. G. B., Chestnut Hill.
1865 Barker, John G., South Bend, Ind.
1898 Barr, John, South Natick.
1893 Bigelow, Mrs. Nancy J., Southborough.
1904 Borst, Theodore F., South Framingham.
1901 Bradley, Miss Abby A., Hingham.
1913 Bradley, Miss Julia H., Roxbury.
1873 Breck, Charles H., Newton.
1902 Breed, Edward W., Clinton.
1908 Briggs, Frank P., Ayer.
1909 Brigham, Mrs. Clifford, Milton.
1914 Brown, F. Howard, Marlboro.
1908 Butler, E. K., Jamiaca Plain.

1914 Campbell, Ernest W., Wollaston.
1910 Camus, Emil, Boston.
1904 Chandler, Alfred D., Brookline.
1910 Churchill, Charles E., Rockland.
1912 Clarke, Mrs. Herbert L., Reading.
1914 Collins, William J., Brookline.
1914 Colt, James D., Chestnut Hill.
1907 Colt, Mrs. James D., Chestnut Hill.
1915 Copson, William A., Roslindale.
1914 Crocker, Mrs. George Glover, Boston.
1914 Crocker, Joseph Ballard, Chatham.
1914 Crompton, Miss Mary A., Worcester.
1881 Crosby, J. Allen, Jamaica Plain.
1875 Curtis, Joseph H., Boston.
1914 Cushing, Mrs. Harvey, Brookline.
1912 Cutler, Mrs. N. P., Newton.
1906 Cutting, Mrs. Isabelle Ladd, Roxbury.

1910 Dahl, Frederick William, Roxbury.
1889 Davis, Frederick S., West Roxbury.
1914 Deland, Mrs. Margaret, Boston.
1911 Dolansky, Frank J., Lynn.
1897 Dorr, George B., Boston.

1903 Evans, Frank H., Malden.

1902 Farlow, Mrs. William G., Cambridge.
1901 Fiske, Harry E., Wollaston.
1894 Fitzgerald, Desmond, Brookline.
1903 Freeman, Miss Harriet E., Boston.
1905 Fuld, Maurice, New York, N.Y.

1912 Gage, L. Merton, Groton.
1902 Garthly, James, Fairhaven.
1912 Goodwin, Mrs. Daniel, East Greenwich, R. I.
1900 Grey, Robert Melrose, Belmont, Cuba.
1897 Grey, Thomas J., Chelsea.

1907 Hall, Harry F., Moorestown, N. J.
1908 Hamilton, Mrs. George Langford, Magnolia.
1910 Handley, A. H., Newton.
1912 Hardy, John H., Jr., Littleton.
1894 Hatfield, T. D., Wellesley.
1910 Hayward, Mrs. W. E., Ipswich.
1891 Heustis, Warren H., Belmont.
1914 Higginson, Mrs. Alexander H., Manchester.
1902 Hildreth, Miss Ella F., Westford.
1902 Hill, Arthur Dehon, Boston.
1884 Hill, J. Willard, Belmont.
1912 Hollingsworth, Mrs. Sumner, Boston.
1913 Holmes, Eber, Montrose.
1913 Houghton, Mrs. Clement S., Chestnut Hill.
1900 Howden, Thomas, Prides Crossing.
1902 Hubbard, Allen, Newton Centre.
1893 Hubbard, F. Tracy, Boston.

1913 Jenkins, Edwin, Lenox.
1903 Johnston, Robert, Lexington.

1898 Kelsey, Harlan P., Salem.
1898 Kennard, Frederic H., Newton Centre.
1912 Kirkegaard, John, Bedford.

1889 Lancaster, Mrs. E. M., Roxbury.
1900 Lawson, Joshua, Marshfield.
1914 Leach, C. Arthur, South Hamilton.
1914 Leary, Dr. Timothy, Jamaica Plain.
1904 Leuthy, A., Roslindale.
1902 Lewis, E. L., Taunton.
1896 Lincoln, Miss Agnes W., Medford.
1914 Longyear, Mrs. Mary Beecher, Brookline.
1901 Loring, Mrs. Thacher, Boston.
1896 Loring, William C., Beverly.
1903 Lumsden, David, Ithaca, N. Y.

1912 McCarthy, Nicholas F., South Boston.
1914 McGregor, Alexander, Malden.
1904 MacMulkin, Edward, Boston.
1890 Manning, A. Chandler, Wilmington.
1914 Morse, Frank E., Auburndale.
1913 Murray, Peter, Manomet.

1895 Nicholson, William, Framingham.
1904 Nicol, James, Quincy.
1903 Nixon, J. Arthur, Taunton.

1913 O'Brien, Mrs. Edward F., Brookline.

1915 Parker, A. S., Stoneham.
1914 Parker, Miss Charlotte E., Ipswich.
1906 Parker, Eliab, Roxbury.
1892 Parker, Walter S., Reading.
1909 Parker, W. Prentiss, Roxbury.
1908 Peabody, Mrs. W. Rodman, Readville.
1914 Pembroke, A. A., Beverly.
1898 Pierce, Mrs. F. A., Brookline.
1902 Pritchard, John, Bedford Hills, N. Y.
1912 Proctor, Dr. Francis I., Wellesley.

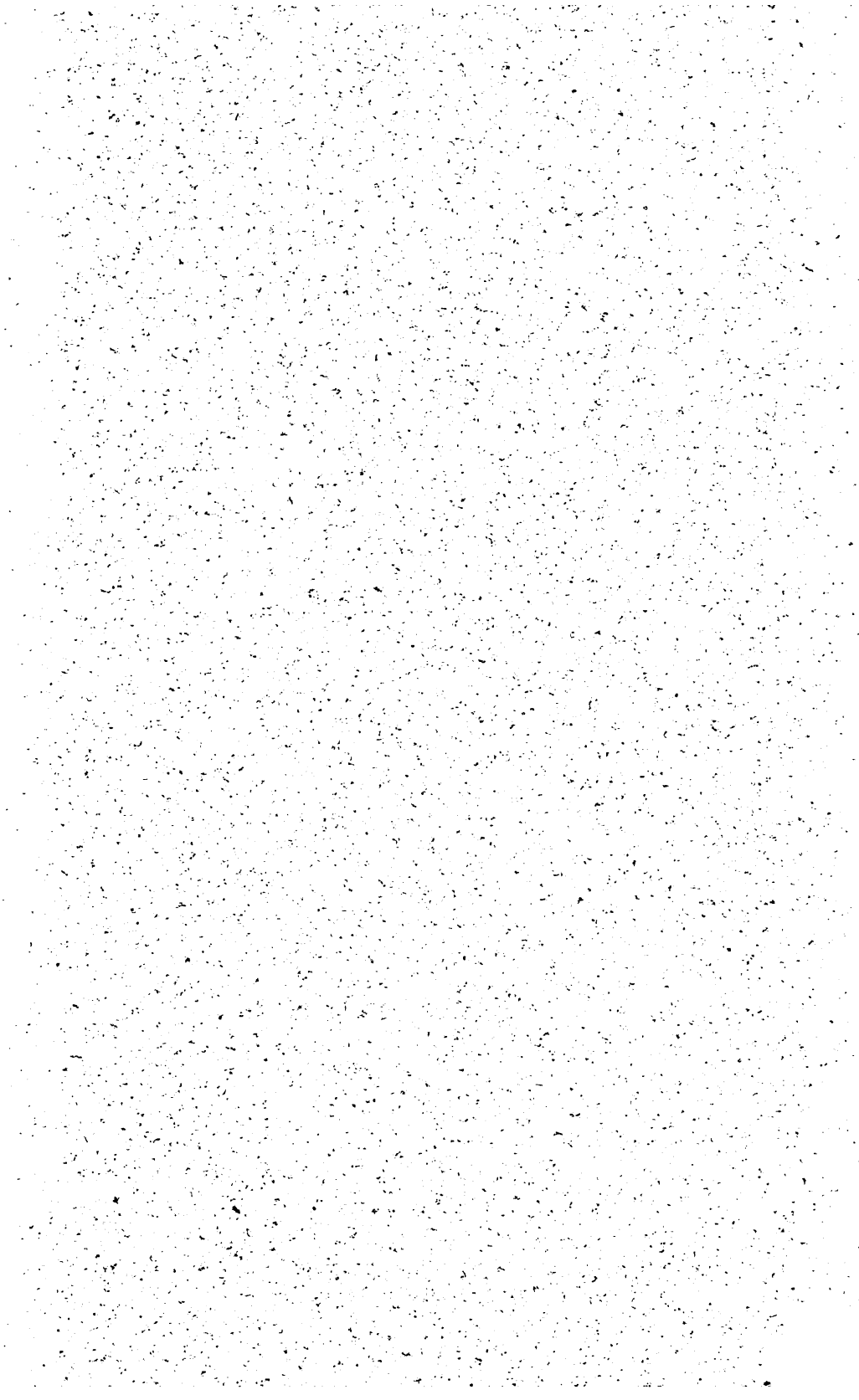
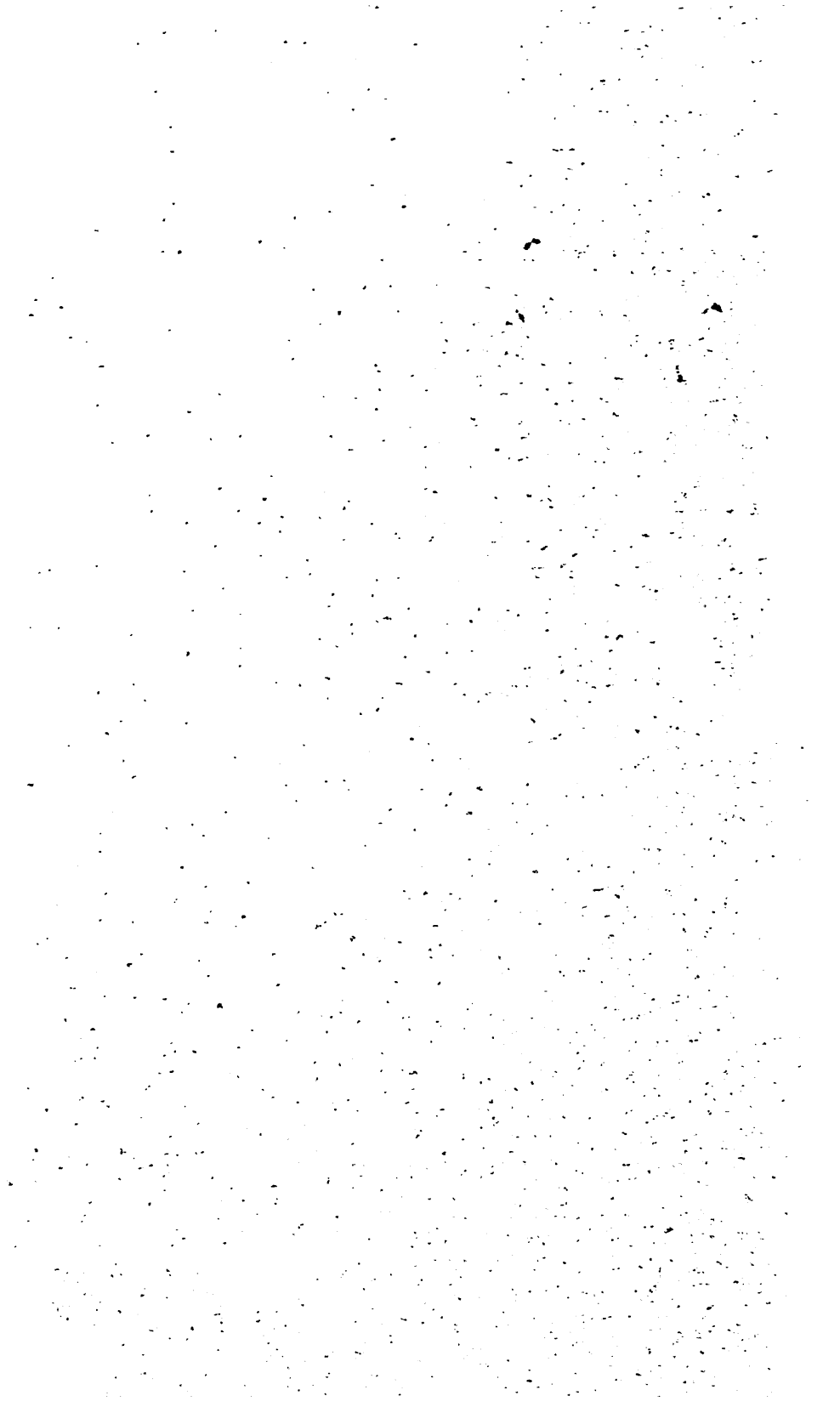
1883 Purdie, George A., Wellesley Hills.
1913 Putnam, Frank P., North Tewksbury.

1906 Rane, Prof. F. W., Waban.
1897 Rea, Frederic J., Norwood.
1912 Reed, H. B., South Weymouth.
1914 Rees, Ralph W., Amherst.
1893 Rich, Miss Ruth G., Dorchester.
1888 Rich, William E. C., Ocean Park, Maine
1900 Robb, Peter B., Whitinsville.
1893 Robinson, Walter A., Arlington
1915 Rosenthal, Wolf, Boston.
1879 Ross, Charles W., Newtonville.
1892 Ross, Henry Wilson, Newtonville.
1903 Ross, Walter D., Worcester.
1909 Russell, Charles F., Weston.
1910 Rust, William C., Brookline.

1907 Sanborn, Edward W., Boston.
1897 Sander, Charles J., Brookline.
1875 Saunders, Miss Mary T., Salem.
1896 Searles, E. F., Methuen.
1910 Sears, Prof. F. C., Amherst.
1907 Seaver, Robert, Jamaica Plain.
1886 Sharples, Stephen P., Cambridge.
1907 Sim, William, Cliftondale.
1915 Slamin, John, Wellesley.
1910 Smith, D. Roy, Boston.
1914 Smith, George N., Wellesley Hills.
1914 Spaulding, Mrs. Samuel S., Springfield Center, N. Y.
1914 Sprague, George H., Ipswich.
1914 Stevenson, Robert H., Readville.
1914 Storey, Mrs. Richard C., Boston.
1914 Sturgis, Miss Lucy Codman, Boston.
1904 Symmes, Samuel S., Winchester.

1869 Tailby, Joseph, Wellesley.
1914 Thayer, John E., Jr., Lancaster.
1909 Tracy, B. Hammond, Wenham.
1913 Tuckerman, Bayard, New York N. Y.
1907 Turner, Everett P., Arlington.
1892 Tyndale, Theodore H., Boston.

1911 Ufford, Charles A., Dorchester.
1911 Unverhau, Heinrich, Marblehead.

1881 Vaughan, J. C., Chicago, Ill.

1915 Wadsworth, Ralph E., Northboro.
1902 Ware, Horace E., Milton.
1914 Washburn, Paul, Boston.
1914 Waterer, Anthony, 3d, Philadelphia, Pa.
1914 Waterer, Hosea, Philadelphia. Pa.
1903 Waugh, Prof. F. A., Amherst.
1889 Welch, Patrick, Dorchester.
1893 Westwood, Thomas H., Jamaica Plain.
1915 Wetterlow, Eric H., Manchester.
1909 Wheeler, George F., Concord.
1897 Wheeler, Henry A., Newtonville.
1907 Whipple, Frank L., Lynn.
1905 White, Miss Margaret, Cambridge.
1901 Wilder, Miss Grace S., Dorchester.
1897 Wilkie, Edward A., Newtonville.
1913 Williams, Mrs. Emile F., Cambridge.
1889 Winter, William C., Mansfield.
1913 Wood, Mrs. Charles, New Bedford.